Tongass Road Condition Survey Report

by

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And

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Area Habitat Biologist

Technical Report No. 00-7

June 2000

Alaska Department of Fish and Game **Habitat and Restoration Division**

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EXECUTIVE SUMMARY

The Tongass Road and Stream Crossing Project and associated work were conducted by the USDA Forest Service (FS) and the Alaska Department of Fish and Game (ADF&G) over the past three years. ADF&G's participation was partially funded with funds from the State's federal grant under Section 319 of the Clean Water Act. This project evaluated fish passage and sources of sediment from non-point source pollution along 60% of the miles of permanent (system) roads on the Tongass National Forest in Southeast Alaska. The remaining 40% of the permanent roads, as well as all of the temporary roads, on the Tongass will have the road condition survey completed in 2001.

This comprehensive monitoring effort initially developed a protocol to collect and analyze data related to fish passage and non-point source pollution control. Then the FS and ADF&G jointly inspected all stream crossings and sources of sediment along 2153 miles roads. There were 273 anadromous fish stream culverts and 622 resident fish stream culverts evaluated for fish passage. Preliminary results indicate that 66 percent of the culverts across anadromous streams (FS' Class I streams) are assumed not to be adequate for fish passage (a total of 179 culverts). Eighty-five percent of the culverts across resident fish streams (FS' Class II streams that naturally do not support anadromous fish) are assumed not to be adequate for fish passage (a total of 531 culverts). Adequate fish passage requires that the weakest swimming fish present in a watershed can pass upstream and downstream through culverts at all flow levels when that species would be likely to pass the same point in the stream, absent the culvert. The above results rely heavily on assumptions regarding swimming capability of juvenile fish and estimated stream flow. While some culverts may be complete barriers to both adults or juveniles, many of the culverts on anadromous streams identified in this report as assumed not to be adequate for fish passage most likely only restrict the movement of juvenile salmonid fish.

Velocity is the most common cause of fish passage restriction in culverts. If a culvert is installed at too steep a gradient or the culvert width is significantly narrower than the streambed width, the water velocity will be increased within the culvert. Very slight changes in the slope of the culvert and the roughness of the substrate within the culvert may significantly change velocity and the ability of fish to pass through the culvert during all of the times of year when they normally move upstream or downstream. Other frequent causes of fish passage problems include perching of the culvert outlet above the water surface, blockage by excessive substrate or woody debris within the culvert and structural damage to the culvert. In most cases, multiple factors interact to restrict fish passage.

The resulting database will be used to maintain historical information on roads, identify existing and potential risks to fish habitat and passage, and prioritize and estimate the costs of needed road maintenance and fish habitat restoration. The FS has been using the data from this collaborative project to identify needed fish habitat restoration work. The data has already helped them obtain an additional $500,000 in annual road maintenance funds for the Tongass for the past two years.

INTRODUCTION

The Tongass Roads and Stream Crossing Project was a collaborative effort between the Alaska Department of Fish and Game (ADF&G), the Alaska Department of Environmental Conservation (ADEC) and the USDA Forest Service (FS). The Road Condition Survey Report is a final project report on the project's comprehensive three-year monitoring effort that focused on Best Management Practices (BMPs) for forest roads. The project assessed the degree of compliance with BMPs that are intended to prevent nonpoint source pollution from the construction, maintenance and closure of culverts, bridges and roads and evaluated the ability of existing culverts to efficiently pass fish. This project is part of the FS' overall effort to evaluate the condition of roads and stream crossings on the Tongass National Forest. This report reflects the initial and second phase of the road condition survey. The FS and ADF&G will continue collaborate over the next two years to complete the Road Condition Survey of all roads on the Tongass and to prioritize the identified needs for maintenance and restoration of fish habitat.

The ADF&G and ADEC cooperated with the FS to finalize the Road Condition Survey protocols that the FS had initiated in 1994 (FSH 7709.58-99-2). The protocol provided a standard mechanism for the long-term collection and storage of information and data analysis related to fish passage and non-point source pollution sources. It established a database and associated tools (GIS, ability to query) to maintain historical information, identify existing and potential threats to fish habitat and passage, prioritize maintenance and restoration, estimate the costs of such efforts and objectively discuss these issues both internally and with other interested parties. Since the initiation of the survey, the road condition survey protocol has been revised to gather more specific data to better evaluate fish passage.

The collection of Road Condition Survey data by the FS and ADF&G over the past three years greatly improved our knowledge and awareness of site-specific and programmatic problems associated with logging roads and stream crossing structures. This project has provided agencies with a mutual interest in protection of fish habitat and migration an opportunity to address these joint concerns in a cooperative and objective manner. Perhaps the most important result of this project has been establishment of a common foundation of information upon which ADF&G, ADEC and the FS can base discussions and decision making relative to prioritizing maintenance and managing stream crossings.

HISTORY OF FOREST SERVICE'S FISH HABITAT PROTECTION POLICIES

The current Tongass Land and Resource Management Plan, or TLMP (USDA, 1999) directs the FS to "maintain fish passage through stream crossing structures." While TLMP now provides more specific guidelines, criteria and species-specific requirements for evaluating fish passage and protecting fish habitat, the core requirement to provide fish passage is not new. Previous land management plans and area guides provided direction relative to fish passage since 1977. The details of the passage requirements also requiring fish passage on some Class II streams but allowing fish passage to be restricted based upon benefit cost analysis of sites. These FS policy changes followed scientific review of the fish habitat relative to stream crossings and consideration of review comments by other agencies. A summary of the policy changes follows.

The Southeast Alaska Area Guide (USDA, 1977) was developed with the participation of the State of Alaska and many concerned citizens and organizations. It provided management direction for fish passage, including the following policy statement: "Fish passage must be assured at all locations where roads cross fish streams." It supported this fish passage policy with the following explanation:

> "Adult and juvenile salmonids must have unhampered access to all fish habitat. Coho, steelhead, cutthroat and Dolly Varden tend to spawn in headwater areas and their fry disperse downstream to fully utilize all habitat, while juvenile fingerlings move about considerably as rearing populations adjust themselves to carrying capacities. Juveniles also move in significant numbers to overwinter in small tributaries where temperatures are moderated by groundwater sources.
>
> Road crossing structures such as round culverts can cause increases in water velocity when improperly designed, often resulting in scouring at the downstream end during periods of high runoff. The scouring of gravel below culverts results in streambed instability and in culvert outlets elevated above the water level. Since the jumping ability of juveniles is limited, and their swimming capabilities in high velocity currents are restricted, fishery biologists recommend the use of crossing structures which maintain the natural stream gradient, width and bottom material. Culvert and bridge installations must not cause to exceed 40 cm./sec. (1.3 ft./sec.) and must allow passage of fish as small as 50 mm. (2 inches) at normal and low flows. These requirements are best met by using small bridges or full arch culverts."

The Tongass Land Management Plan (USDA, 1979) stated: "The Forest Service's goal is to *protect and or enhance fish resources and their habitat* (Area Guide, p. 79). Stated another way, the goal is to preserve the biological productivity of every fish stream on the Tongass" (TLMP, FEIS, Part 1, 1979).

In 1986, the Aquatic Habitat Management Handbook (AHMU)(FSH 2609.24) was developed with the following objectives:

1. Ensure a consistent Regional approach to aquatic habitat management through established standards, guidelines and prescriptions.
2. Coordinate the management of multiple watershed resources through the interdisciplinary team process and interaction with cooperating agencies.

The AHMU handbook also allowed for site-specific management in situations where there is a limited amount of fish habitat upstream. (See AHMU PRESCRIPTIONS (64.13a & 64.23a). The management prescription for AHMU Class I stated: "Provide fish passage on all streams with natural stream gradients of 4% or less, using typical designs for bridges or culverts installed at a gradient of 1 percent or less. For streams with gradients steeper than 4 percent, evaluate the potential trade-off between loss of rearing fish production and the cost of providing rearing fish passage. The 4-6 percent gradient stream reaches are especially critical since standard culvert design cannot be implemented to provide fish passage. Thus, fish passage involves open-bottom structures, baffled culverts or other non-standard structures which are much more costly than standard designs. Evaluate this trade-off using the Fish Passage Trade-off Evaluation appended to this AHMU Project Level Category. In most situations, the high economic and resource value of Class I fish habitat will justify additional expenses required to provide fish passage….In cases where after the evaluation, fish passage is foregone, a copy of the completed form (R10-2600-11 [1/86]) shall be sent to the local Alaska Department of Fish and Game, Habitat Division representative. Original forms shall be kept on file at District Offices."

The management prescription for AHMU Class II streams stated: "Provide fish passage on all streams with natural stream gradients of 4% or less, using typical designs for bridges or culverts installed at a gradient of 1 percent or less. For Class II streams with gradient steeper than 4 percent, do not provide fish passage unless economically justified (use form in Section 64.13c)."

The report Fish Passage Through Culverts (USDA Forest Service Report No.FHWA-FL-90-006, 1990) explains the critical need to identify and replace existing road drainage structures. In addition to the need to accommodate efficient fish passage when a culvert or bridge is installed, the report emphasizes that fish passage must be maintained over the design life of the structure. The report states: "The identification and planning for replacement of existing road drainage structures is an area of high national need. This will require unprecedented cooperation among biologists, engineers and hydrologists. The dollars associated with drainage structure replacement will be staggering, as is the potential impact to remaining fish runs." The report estimates that in areas of high streambed abrasion or corrosive soils the design life of pipes is less than 20 years. Where these pipes are located under substantial road fill, the cost of replacement may become very expensive. The age of many structures on the Tongass National Forest approaches or exceeds 30 years.

The Anadromous Fish Habitat Assessment Report (USDA, 1995), was written by a panel of experts in fisheries and hydrology in response to direction from Congress. The study reported on the effectiveness of the FS' salmon and steelhead habitat protection program on the Tongass and that additional protection was needed. The report raised concerns over road maintenance and fish passage through culverts, and stated:

> "Maintaining roads was a concern identified by some of the field review experts and our Team. Funds for maintaining the many miles of open roads on the Tongass seem inadequate. Low-use roads typically are not stabilized or "put to bed"--such as by removing culverts, constructing waterbars, outsloping road surfaces, and seeding after timber harvest.
>
> Stream crossings should be designed and maintained to ensure the upstream and downstream movement of all life stages of anadromous fish. Similar passage criteria are desirable for resident streams. Site-specific exceptions are to be approved by a line officer in consultation with a fisheries biologist and the Alaska Department of Fish and Game."

The FS directed in the <u>April 1999 Record of Decision for the Tongass Land and Resource Management Plan</u> that the FS implement Standards and Guidelines that fulfill the recommendations of the <u>Anadromous Fish Habitat Assessment Report</u> As stated in the April 1999 ROD:

> "Another Regional Forester decision was made to incorporate all the recommendations made in the Anadromous Fish Habitat Assessment (AFHA) report for additional protection, because AFHA is the most comprehensive and credible scientific review of the measures needed to protect fish habitat on the Tongass National Forest."

The current Tongass Land and Resource Management Plan includes the following standards that pertain to the protection of fish habitat.

"G. Maintain fish passage through stream crossing structures. (Consult the Aquatic Habitat
Management Handbook, FSH 2609.24.)

> 1. Stream Class I: Maintain, restore or improve the opportunities for fish migration.
>   a) Use juvenile coho as the design species for upstream fish migration.
>   b) When a culvert is selected for stream crossing, design, install, and maintain the culvert to prevent the creation of water velocity or height barriers at the outlet of the pipe, and to allow upstream passage of juvenile coho. Passage may be delayed for up to 4 days due to high water velocity during the mean annual flood.
>
> 2. Stream Class II: Maintain, restore or improve the opportunities for the natural migration of resident fish, where feasible (see glossary). Overall, the intent is to

provide passage of resident fish in all Class II streams, but occasionally it is not feasible to protect short sections of habitat and passage will be restricted.

a) In determining feasibility, consider the following:

1) Presence of known sensitive or unique fish populations.

2) The cumulative impacts of not providing fish passage at multiple sites in the same watershed.

3) In Class II streams which flow directly into Class I streams: the upstream and downstream linkages between the anadromous and resident life strategies of the same species.

4) Advice from the Alaska Department of Fish and Game.

b) Use Dolly Varden char, rainbow trout, and/or cutthroat trout juveniles (greater than one year old) as the design species for fish migration in Moderate Gradient-Mixed Control (MM) and Flood Plain (FP) process groups (see Appendix D), depending on which specie(s) is(are) present. Use adult Dolly Varden char, rainbow trout, and/or cutthroat trout as the design species in all other process groups."

FEDERAL AND STATE LAWS REGARDING FISH HABITAT PROTECTION

The federal Clean Water Act also includes an overarching requirement for providing fish passage at forest road stream crossings. Section 404 of the Act normally requires authorization from the U.S. Army Corps of Engineers prior to the discharge of dredge or fill material into waters of the United States, including wetlands and tributaries to navigable waters. Section 404(f)(1) provides an exemption to this requirement for the construction or maintenance of forest roads. It states: *"where such roads are constructed and maintained in accordance with Best Management Practices (BMPs) to assure that flow and circulation patterns and chemical and biological characteristics of waters of the United States are not impaired, that the reach of the waters of the United States is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized."* Of the fifteen BMPs, which must be implemented to qualify for this exemption, BMP vii specifically states: *"The design, construction and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the waterbody."*

The State standard for fish passage is found in Alaska Statute 16.05.840:

> "If the commissioner considers it necessary, every dam or other obstruction built by any person across a stream frequented by salmon or other fish shall be provided by that person with a durable and efficient fishway and a device for efficient passage of downstream migrants. The fishway or device or both shall be maintained in a practical and efficient manner in the place, form and capacity the commissioner approves, for which plans and specifications shall be approved by the department upon application to it. The fishway or device shall be kept open, unobstructed, and supplied with a sufficient quantity of water to admit freely the passage of fish through it."

The ADF&G has worked to assure anadromous fish habitat protection and anadromous and resident fish passage on Tongass National Forest roads since Statehood. Prior to 1998, ADF&G had limited review opportunity for the design of instream structures on the Tongass National Forest. Their review was restricted to the conceptual stream crossings identified by the FS in documents prepared under the National Environmental Policy Act (NEPA) and under the Alaska Coastal Management Program (ACMP). In March of 1998, the ADF&G and the FS signed the Supplemental Memorandum of Understanding No. 1 (SMOU) Regarding Fish Habitat and Fish and agreed to:

- Protect fish habitat and provide for efficient passage;
- Reach concurrence prior to instream activities;
- Work together to develop design standards; and
- Resolve disputes in a timely manner.

The SMOU recognizes common management goals related to protection of fish habitat and efficient fish passage, and provides an updated interagency procedure for reviewing proposed fish stream crossings and other activities that could affect fish habitat.

It is important to understand the distinction between performance standards vs. design standards. References made to fish passage in Title 16(State of Alaska) and Section 404(COE) are performance standards. Design standards are more detailed and need to meet the objective of the performance standards. The TLMP Standards and Guidelines are a combination of both.

METHODS

DEVELOPMENT OF ROAD CONDITION SURVEY PROTOCOLS

The USFS began development of the Road Condition Survey Protocols in 1994, and started systematic surveys in 1995 with surveys of roads on the Petersburg Ranger District. In 1998 ADF&G and ADEC became involved in the revision of the protocols. The protocols are structured to collect data, which can be easily sorted, displayed and queried. Defined descriptive codes are used to ensure objective and maximize consistency between field crews.

The protocols have evolved as field crews and data users identified needs for additional data or clarification of existing procedures. The most significant changes have been the transition to more precise measurements of culverts and stream characteristics at verified fish streams, including the culvert slope streambed gradient, tailcrest and other relationships between the culvert and the stream. This level of precision provides data needed for hydraulic models such as FishXing.

Additional descriptive codes have been added to address most conditions encountered in the field and avoid dependence on notes to capture data.

DATA COLLECTION

FS and ADF&G personnel collected Field data, with additional assistance from the Alaska Department of Environmental Conservation (ADEC). Field crews used the protocols documented in the "TRANSPORTATION SYSTEM MAINTENANCE HANDBOOK FSH 7709.58-99-2" (Appendix A). The majority of the data was collected in 1998 and 1999. Although, most of the data on the Petersburg District was originally collected earlier, with additional measurements taken in 1999. As protocols evolved, data collected under earlier protocols was reviewed and updated with additional field visits as needed.

Appendix A contains channel cross-section diagrams and descriptions of measurements. Culvert, road, and stream data was collected primarily by USFS personnel. ADF&G provided habitat biologists and technicians to capture and identify fish, assist in collection of measurements and evaluate fish habitat. When possible, crews were comprised of an engineer and a fisheries biologist or technician. Biologists from both the Forest Service and ADF&G also reevaluated fish presence and habitat in subsequent years to verify the quality of data collected in previous years, fill any data gaps and collect additional data required for more detailed analysis.

Data was collected using Hewlett Packard palmtop computers containing an MS Excel® spreadsheet and downloaded onto a personal computer upon returning to the office. The milepost was recorded using a digital odometer with an accuracy of +/- 0.002 miles where access by a vehicle was possible. A measuring wheel with similar accuracy was used where roads were inaccessible by vehicle. The project leaders initiated a procedure of writing the milepost on each culvert with a paint pen for future reference. This recommendation was implemented on the Petersburg and Wrangell Ranger Districts. The other districts have implemented other processes to track individual culvert identity.

Fish presence was verified using an electroshocker, baited minnow traps and/or visual verification. The protocols called for electroshocking upstream and downstream for a distance of five pools or 100 feet, whichever was greater. Minnow traps were used where electroshocking was likely to be inefficient, such as palustrine channels, and in waters inhabited by steelhead. Steelhead were occasionally captured by electroshocking where their presence was previously unknown. Minnow traps were soaked for at least 30 minutes. Sampling was done during periods when flows allowed efficient sampling (low to moderate flows), and when juvenile and adult fish were likely to be present (between May 15 and September 30).

QUALITY CONTROL

To ensure consistency of data collected, training sessions were conducted prior to each field season for all personnel scheduled to participate in the surveys, whether or not they had been previously trained. In addition to basic protocol instruction, training addressed changes in protocols from year to year.

Training sessions included both office and field sessions to familiarize participants with the structure of the database and data collection procedures, including fish identification, fish sampling (electroshocker and minnow traps), channel type classification, measurement techniques, use of palmtop computers and safety.

Consistency of data collection was stressed in training sessions and in training materials. An MS PowerPoint® presentation was prepared with photos of typical scenarios and sample data collection forms showing the correct data elements and codes to be recorded (Appendix B).

The project's technical supervisor continued to assist field crews after the initial training to check their understanding of protocols and their thoroughness in collecting and recording data.

Data collected was periodically checked for completeness by both the USFS and ADF&G. Field verification visits were conducted to ensure that data collected in previous years was accurate and complete. Field surveys were repeated on sites to correct errors and collect additional information.

Despite continued supervision and review, errors and data gaps inevitably occur in a project of this magnitude. Some records with missing measurements could still be used for this analysis. For example, if a culvert was completely blocked yet was missing a bedwidth measurement, it was not eliminated from the sample because it obviously blocked fish passage.

Similarly, if anadromous fish were verified downstream, but not upstream of the structure, the structure was still considered to be a potential anadromous stream crossing. The same assumption was applied to resident fish. While habitat is assumed to be present upstream, in some cases the extent of upstream habitat may be very limited. This is more likely to be true on resident-only fish streams. Roads are typically located at natural slope breaks, particularly in the upper portions of watersheds, where the natural stream gradient is often steeper above the road than below the road. This is also accompanied by a change in channel process group, usually from high-gradient contained to moderate-gradient, mixed control.

Detailed assessment of the quantity and quality of habitat upstream of road crossings was beyond the scope of this project. A cursory estimate may be possible using GIS analysis of channel types. Even this, however, is a very limited option since up to 50% of the resident streams are probably not currently in the GIS database since these streams are often very small. The FS has recently begun an assessment of the habitat upstream of the culverts thought to restrict fish passage. This assessment will help to prioritize reconstruction work.

Measurements necessary for analysis of fish passage were missing for 156 anadromous fish stream culverts and 332 resident fish stream culverts where fish presence was verified. Most of these were culverts surveyed in 1998, prior to requiring more detailed measurements to better evaluate fish passage. However, the Road Condition Survey was never intended as a substitute for the more detailed hydrological data needed to design a stream crossing structure. Only those Districts on which the early protocol was implemented (Petersburg, Wrangell, Thorne Bay, Craig and Yakutat) are affected. The remaining districts (Ketchikan, Sitka, Hoonah and Juneau) were not involved in early implementation, and therefore have benefited from a more fully developed protocol. Stream crossing structure measurements, grouped by FS Ranger District, are shown in Appendix E.

The Draft Road Condition Survey Protocol, project proposal, operational plan and draft technical report were all submitted for peer review. All substantive recommendations and questions were addressed. The following is the list of agencies, organizations and independent scientists from which peer review was requested:

Alaska Department of Fish and Game
Alaska Department of Environmental Conservation
Alaska Department of Natural Resources
Alaska Department of Transportation and Public Facilities
U.S. Environmental Protection Agency
USDA Forest Service
U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
National Marine Fisheries Service
Sealaska Corporation
Independent fisheries biologist

DATA ANALYSIS

There are approximately 3594 miles of system or permanent roads on the Tongass National Forest. As of March 2000, Road Condition Surveys have been completed on 2153 miles of these roads. The Road Condition Survey database contained over 50,000 records as of January 2000. These included approximately 900 culverts with associated fish verification data and complete measurements for relevant protocols.

The data was organized by FS Ranger District to facilitate handling such a large database. Data was checked for consistency of column headings, column order and the correct units of measurement. Obvious errors were corrected. Those records containing questionable data were not used for analysis. Records missing measurements needed for the evaluation of fish passage were pasted into a separate worksheet to allow for analysis at a later date when the measurements have been collected. Additional columns were added for Verified Aquatic Habitat Management Unit category, Cumulative Verified Fish Presence, Culvert Perch Height (tailcrest), Culvert Perch Height (water surface), Culvert Gradient, Bedload Depth at the Culvert Inlet, Invert Bedload Percent and Culvert/Bedwith ratio. Descriptions of the formulas used for these measurements are contained in Appendix C.

Analysis of data was primarily done with a series of queries of the Excel data. The data for each District was grouped into a series of worksheets representing specific data elements. The following is a list of the worksheets along with a description of their contents:

ALL CULVERTS	All corrugated metal pipe and plastic culvert records
ALLFISH	All sites where fish presence was verified (bridges and culverts)
FISHPASS	All culverts with complete measurements
MISSING DATA	All culverts with verified fish and incomplete measurements
REMOVED	All sites where a structure (bridge or culvert) was removed
BRIDGES	All bridges
CROSS SECTION	All cross sectional features
EROSION	Parameter designated cutslope, fillslope or surface erosion.
BLOCKED	All blocked culverts
DITCH	Parameter designated as ditch plugging
INLET EROSION	All stream courses with inlet erosion noted
OUTLET EROSION	All stream courses with outlet erosion noted
CATCH BASIN	All records with an entry for catchbasin
DITCH BLOCK	All records with an entry for ditch block

FISH PASSAGE

Evaluation of the potential for efficient fish passage through culverts is a complex issue. Efficient fish passage means that the weakest swimming fish likely to be present in a waterbody can pass upstream and downstream through the structure at all flow levels when that fish would be likely to pass the same point in the stream, absent the structure. Fish passage is not required at all flow levels, only at levels when the naturally occurring species and life stages of fish in a particular drainage would normally be moving either upstream or downstream. This analysis relies heavily on assumptions regarding swimming capability of juvenile fish, fish movement in relationship to discharge and estimated flow discharge. While some culverts may be complete barriers to both adults and juveniles, many of the culverts that this study determined were "assumed not to be adequate for fish passage" may restrict only the movement of juvenile fish at certain flow conditions.

The presence of fish above a culvert is an inadequate indicator of the ability of that culvert to efficiently pass fish for the following reasons:

- While a few juvenile or small fish may be strong enough to swim against the increased velocity in the culvert, the majority may not, or passage may be restricted to very limited time periods related to high or low flows, resulting in underutilization of available habitat;
- Adults may pass through the culvert and spawn, while juveniles from downstream (or which have moved downstream at some time) are unable to pass through the culvert; and
- Resident fish above a culvert may represent an established population that was stranded by the blockage.

The best evaluation of fish passage would be actual field assessments of fish swimming performance in natural conditions during all flow conditions when various age classes of fish want to move either upstream or downstream. However, this is not cost-effective or practicable at every culvert.

Velocity is the most common cause of fish passage restriction in culverts. If a culvert is installed at too steep a gradient or the culvert width is significantly narrower than the streambed width, the water velocity will be increased within the culvert. Very slight changes in the slope of the culvert and the roughness of the substrate may significantly change velocity. For example, a slope change of only .5 to 1.0% may represent a significant change in the efficiency of the culvert with respect to fish passage. Recognition of this sensitivity was the primary reason for modifying protocols to increase the precision of measurements at fish stream crossings.

Other frequent problems include perching of the culvert outlet above the water surface, blockage with substrate or woody debris and structural damage to the culvert. In most cases multiple factors contribute to restricting fish passage.

Juvenile coho salmon reach approximately 55 millimeters in length by the autumn of their first year when they normally move upstream during relatively high streamflows. This age class of coho salmon have been identified as the design fish for fish passage in Southeast Alaska because they are assumed to be the weakest swimming fish that typically pass upstream through culverts during the season of heaviest rain. The 55-millimeter size is based on the average size of juvenile coho at the end of their first season of growth, which ends in September. This size was determined from trapping data collected across the Tongass.

Kahler and Quinn of the University of Washington recently completed an extensive literature search regarding juvenile and resident salmonid movement and passage through culverts (Kahler and Quinn, 1998). Their report states: "Redistribution of juvenile coho upstream to winter rearing areas often begins in September, usually triggered by the first major freshet. Most studies showed a peak in movement in October-November. Upstream movement was often into smaller tributaries from larger rivers or into off-channel habitats. The distances moved ranged from hundreds of meters to tens of kilometers. Many studies found fish moving upstream into off-channel areas throughout the winter."

Studies in Southeast Alaska also documented, juvenile salmonids migrate upstream in search of overwintering habitat in September and October. Movement is mostly up lower-order tributaries and into off-channel habitats (Murphy et al. 1984). Most studies report the largest peak in upstream movement during fall to early winter (e.g. Peterson and Reid 1984.

Despite the substantial knowledge about juvenile fish movement and passage, more knowledge is needed in some specific areas. Assessment of juvenile coho swimming capability through various types of culverts in natural field conditions is necessary to verify the assumptions used in mathematical predictions during culvert design. Some culvert design assumptions are based upon studies of species not native to the Tongass. Additional information is needed on the migration timing of juvenile fish to determine if the State of Alaska's Q2-2 day duration flow is an appropriate standard. This standard requires that a culvert or bridge accommodate the efficient passage and movement of fish, both upstream and downstream, at all flows up to and including a mean annual seasonal flood discharge with a two-day duration for the specific times of year that the weakest swimming fish (the design fish) present in the waterbody must be assured safe passage. More field research is needed on the biological implications of a more frequent or longer delay in fish migration through a culvert. Specific information is also needed on the migratory habits of fish in high gradient, headwater streams supporting only resident fish.

Although this analysis uses a 55-mm juvenile coho as the design fish, it is likely that smaller and weaker coho salmon would be more appropriate and, therefore, the criteria for maximum flow through the culvert would be different. Movement both up and downstream has been documented for emerging coho fry (Kahler and Quinn, 1998) that would be smaller than a 55-mm juvenile. Likewise, both salmonids and resident fish must seek residual pools and flowing water during dry periods in the summer when portions of streams commonly go dry. It is reasonable to expect these fish to go either upstream or downstream depending on the location of the nearest residual water. Fish passage needs for fry emerging from their redds and later during the summer represent areas for future research in Southeast Alaska.

Culverts may also impede the movement of both adult and juvenile fish at low flows. If the culvert is not properly bedded or buried, water may flow under as well as through the culvert. This is a common problem where shot rock is used for bedding material without sufficient fine materials to seal the bed and prevent leakage of water below the culvert. Burial of a culvert in proper bedding material should be a minimum of 20 percent of the height for arch pipes and more for round culverts.

Sub-surface flows occur naturally in streams. Low flows can be exasperated if a culvert is significantly wider than the natural stream channel in which it is installed. In this case, the culvert may spread minimal flows over too wide an area, reducing depths enough to prevent fish passage. If gravel is present in such a culvert, the flow may be subsurface, even though it passes through the barrel of the culvert. This problem can be corrected by installing a weir across the culvert to raise the water level within the culvert.

In essence, fish need to efficiently pass through a culvert at all normal flows during which fish movement is naturally occurring. As flows approach the two-year average flood, natural fish movement is assumed to cease until flows fall to a passable level. The very limited hydrological flow data available for small watersheds in Southeast Alaska indicates that within 24 hours on each side of a flood with a 2-year return period flows drop to about 40% of the flood flow (Gubernick, 1999). While no scientific studies have documented fish passage across these various flows, ADF&G and the FS have assumed that juvenile coho are unlikely to move upstream for a short period of time under natural conditions at peak flows.

A working group comprised of ADF&G, Alaska Department of Transportation and Public Facilities and the FS culvert and fish passage experts developed criteria to evaluate if existing stream crossing structures were providing for efficient passage of juvenile coho salmon in Southeast Alaska. This group included:

Mike Furniss	FS, Six Rivers National Forest Watershed Interactions Team
Susan Firor	FS, Six Rivers National Forest Watershed Interactions Team
Ken Vaughn	FS, Region 10
Bob Gubernick	FS, Stikine Area, Tongass National Forest
Steve Levesque	FS, Ketchikan Area, Tongass National Forest
John McDonell	FS, Petersburg Ranger District
Dick Aho	FS, Stikine Area, Tongass National Forest
Bill Lorenz	FS, Chatham Area, Tongass National Forest
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Jim Cariello	ADF&G, Habitat and Restoration Division

Figure 1 below contains a flowchart developed by the group, which depicts the process used to evaluate fish passage through existing structures. Table 1 displays assumptions regarding restrictions to fish passage that was developed by the working group based on the best information available in 1999 and their expertise. These criteria will be updated through a similar interagency process as new information becomes available.

Figure 1- Fish passage evaluation flowchart

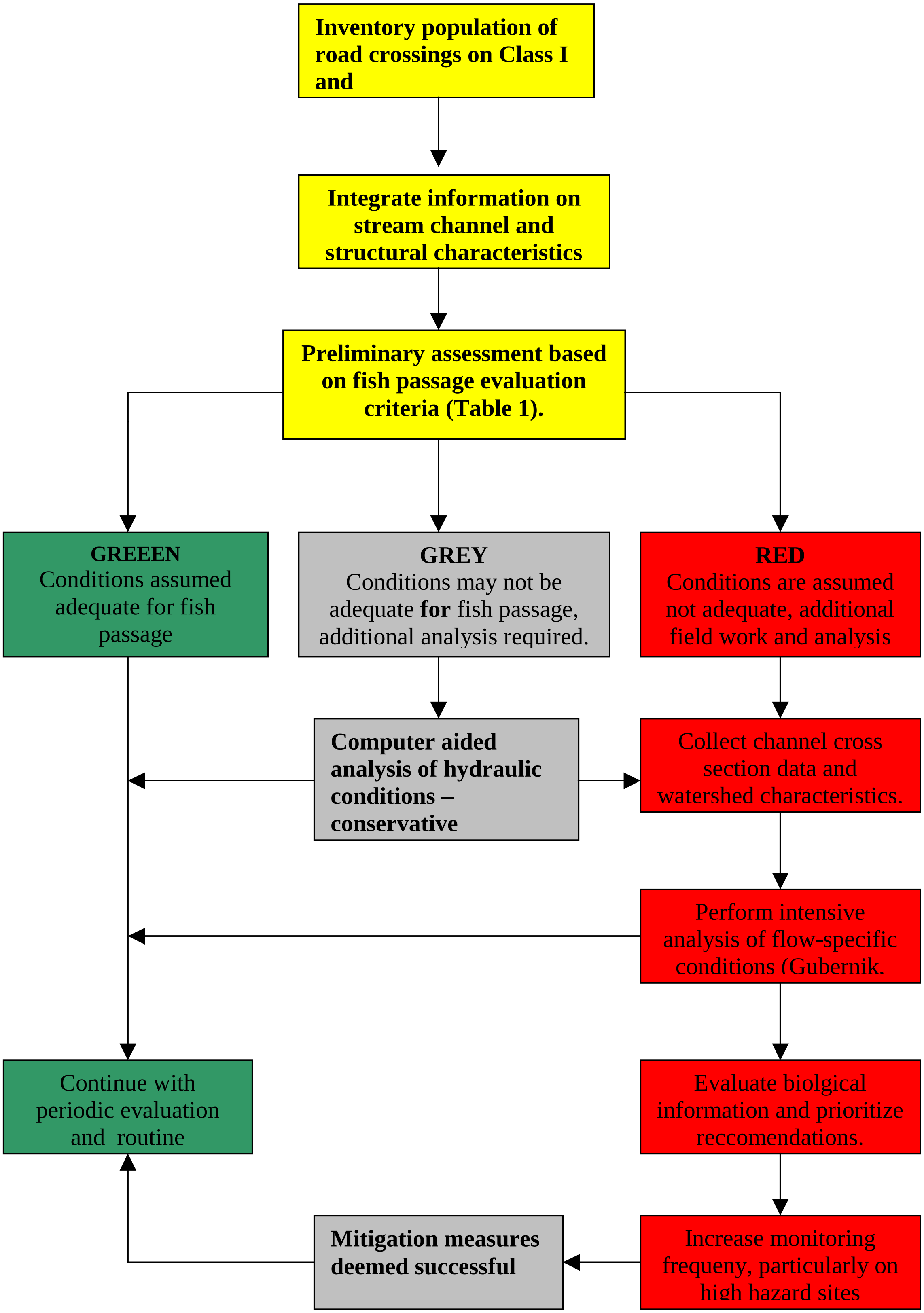


Table 1. Fish passage evaluation criteria.

	Structure	Green1	Grey2	Red3
1	Bottomless pipe arch or countersunk pipe arch, substrate 100% coverage, invert depth greater than 20% of culvert rise.	Installed at channel grade (+/- 1%), culvert span to bankful width ratio of 0.9 to 1.0, no blockage.	Installed at channel grade (+/- 1%), culvert span to bankful width ratio of 0.5 to 0.9, less than 10% blockage.	Not installed at channel grade (+/- 1%), culvert span to bankful width ratio less than 0.5, greater than 10% blockage.
2	Countersunk pipe arches (1x3 corrugation and larger). Substrate less than 100% coverage, invert depth less than 20% of culvert rise.	Grade less than 0.5%, no perch, no blockage, culvert span to bedwidth ratio greater than 0.75.	Grade between 0.5 -2.0%, less than 4" perch, less than 10% blockage, culvert span to bedwidth ratio of 0.5 to 0.75.	Grade greater than 2.0%, greater than 4" perch, greater than 10% blockage, culvert span to bedwidth ratio less than 0.5.
3	Circular CMP 48 inch span and smaller, spiral corrugations, regardless of substrate coverage.	Culvert gradient less than 0.5%, no perch, no blockage, culvert span to bedwidth ratio greater than 0.75	Culvert gradient 0.5 to 1.0%, perch less than 4 inches, less than 10% blockage, culvert span to bedwidth ratio of 0.5 to 0.75.	Culvert gradient greater than 1.0%, perch greater than 4 inches, blockage greater than 10%, span to bedwidth ratio less than 0.5.
4	Circular CMPs with annular corrugations larger than 1x3 and 1x3 spiral corrugations (>48" span), substrate less than 100% coverage, invert depth less than 20% culvert rise.	Grade less than 0.5%, no perch, no blockage, culvert span to bedwidth ratio greater than 0.75.	Grade between 0.5 -2.0%, less than 4" perch, less than 10% blockage, culvert span to bedwidth ratio of 0.5 to 0.75.	Grade greater than 2.0%, greater than 4" perch, greater than 10% blockage, culvert span to bedwidth ratio less than 0.5.
5	Circular CMPs with 1x3 annular corrugations (all spans) and 1x3 spiral corrugations (>48" span), 100% substrate coverage, substrate depth greater than 20% of culvert rise.	Grade less than 1%, no perch, no blockage, culvert span to bedwidth ratio greater than 0.75	Grade 1.0 to 3.0%, perch less than 4 inches, less than 10% blockage, culvert span to bedwidth ratio of 0.5 to 0.75.	Culvert gradient greater than 3.0%, perch greater than 4 inches, blockage greater than 10%, culvert span to bedwidth ratio less than 0.5.
6	Circular CMPs with 2x6 annular corrugations (all spans), 100% substrate coverage, substrate depth greater than 20% of culvert span.	Grade less than 2.0%, no perch, no blockage, culvert span to bedwidth ratio greater than 0.75	Grade 2.0 to 4.0%, less than 4" perch, less than 10% blockage, culvert span to bedwidth ratio of 0.5 to 0.75.	Grade greater than 4.0%, greater than 4 inch perch, greater than 10% blockage, culvert span to bedwidth ratio less than 0.5.
7	Baffled or multiple structure installations		All	
8	Log stringer or modular bridge	No encroachment on bedwidth.	Encroachment on bedwidth (either streambank).	Structural collapse.

To avoid misinterpretation, users must understand that this table and flowchart do not represent design standards. Rather, these attempt to define whether efficient fish passage is achieved at the current time through existing structures. Well-designed culverts must achieve efficient fish passage over the entire useable life of the structure. It is also important to understand that while this flowchart and table represent thoughtful consideration and significant field experience, as well as available literature, the criteria are likely to change as they are verified in the field.

The table categorizes existing culverts into three classes:

- **GREEN**: Conditions are **assumed to be adequate for fish passage** using the Q2-2 day duration flow standard
- **RED**: Conditions are **assumed not to be adequate for fish passage**) using the Q2-2 day duration flow standard; and
- **GREY**: **Additional analysis is required** to determine if conditions are adequate for fish passage using the Q2-2 day duration flow standard. Computer aided analysis of hydraulic conditions using the FishXing program is necessary for a definitive answer.

The fish passage design criteria for high flows corresponds to the mean annual flood with a two-day duration for the specific time of year that the design fish is moving upstream. The mean annual flood discharge (Q2) is the arithmetic mean of all annual floods at a given site and should not be confused with the flood having a recurrence interval of one year. The mean annual flood has a recurrence interval of 2-years for normal distributions and 2.33 years according to the theory of extreme values as applied to floods.

An exception to the Fish Passage Evaluation Criteria Table was made for culverts in palustrine channels. Palustrine channels are very low gradient (generally <1%) streams associated with low relief landforms and wetlands. Water movement is slow, so these channels typically act as traps and storage areas for fine organic and inorganic sediments. Beaver activity is frequently associated with them, making it difficult to properly measure the bedwidth of the channel and other culvert measurements referenced in the fish passage table. In addition, it is difficult to install culverts at a level gradient since soft silt and organic bed material often allows the culvert to settle following installation. The culvert width/bedwidth ratio and culvert gradient were evaluated individually in palustrine channels. Culverts in these channels often contain standing water at all flows, water velocities and culvert gradients, so fish passage problems are uncommon.

Perching of the culvert outlet above the surface of the exit pool is another very common obstacle to fish passage. For the purposes of this analysis, efficient fish passage was assumed for perch heights (jumps) of 4 inches or less.
The water level present in the culvert at the time of the survey is not a true measure of perch height since it is flow dependent. Evaluation of perch height was done using a conservative analysis that compared the elevation of the bottom of the culvert at the outlet, to the elevation of the tailcrest. The tailcrest is a deposition of bedload

downstream of the culvert, which controls the water level inside the culvert. In situations where there was no true tailcrest, a tailwater control elevation was taken at a point three times the culvert diameter downstream from the outlet. For these culverts, analysis of perch height required evaluation of the outlet pool depth and comments recorded in the field to determine if the culvert outlet was perched.

Ideally, perch height should be evaluated at various discharges below and up to the high flow discharge criteria. A more accurate way to determine perch would be to perform a backwater calculation of the edge of the tailwater reach and then compare the computer model's estimate of water surface with the culvert invert over a range of discharges up to the design discharge for fish passage. However, the data required to run these calculations was too time consuming to collect for this comprehensive survey of all the culverts across the Tongass.

Appendix D contains a sample of the final product of the FishXing analysis.

<u>WATER QUALITY</u>

Analysis of road prism features affecting water quality was done with both queries of the Excel data and spatial analysis using Arcview GIS. The data element "Descriptive Parameter" contains several codes that were useful in identifying water quality concerns associated with the road prism. Cut-Slope, Fill-Slope, Ditch, Quarry and Surface Erosion were the primary parameters queried. In addition, the data elements "Ditch Block", "Catch Basin", "Inlet Erosion", "Outlet Erosion" and "Failure Mechanism" also provided valuable information concerning erosion and related to water quality concerns.

An approach to using GIS to conduct spatial analysis of the road condition survey data was developed to further assess the potential risks to fish habitat of sediment sources. This would identify "sediment source risk zones" 200 feet in diameter around documented sediment sources, such as cutslopes and eroding ditches. A "high potential for sediment delivery risk zone" would be identified within 200 feet of the banks of fish streams. Where these risk zones overlap, fish habitat would be considered at risk from non-point source pollution, or sediment.

RESULTS

FISH PASSAGE

273 Class I culverts (anadromous fish streams) and 622 Class II culverts (resident fish only) were evaluated for fish passage. The culverts used for the analysis of fish passage represent 65% of the culverts on streams with verified fish presence in the database. The remaining 35% of the culverts that are missing measurements should be made a high priority so that an evaluation of fish passage can be completed.

The database contains 60% of the system (permanent) roads on the Tongass National Forest. The remaining 40% of the roads will be surveyed during 2000 and 2001. For the 2153 miles of system road surveyed, there was an average of one culvert across an anadromous stream every 5.0 miles of road, and one culvert across a resident stream every 2.25 miles of road. This average frequency does not include bridges or removed culverts and must be considered a low estimate due to the limited fish sampling effort to verify fish presence above and below each culvert and the seasonality of fish presence at specific sites. The average frequency of all types of stream crossings, including culverts and bridges, was one across anadromous fish streams for every 3.9 miles of permanent road, and one across resident fish streams for every 2.1 miles of permanent road.

GREEN/GREY/RED CATEGORIES OF CULVERTS

There were a total of 895 culverts, which contained the measurements necessary to evaluate fish passage. The following table displays the results of the analysis using the fish passage evaluation criteria.

Table 2. -Analysis of culverts in the GREEN/GREY/RED categories.

	GREEN	GREY	RED
ANADROMOUS STREAMS	47 (17%)	47 (17%)	179 (66%)
RESIDENT STREAMS	36 (6%)	55 (9%)	531 (85%)
TOTAL	83 (9%)	102 (11%)	710 (80%)

Note: The FS typically installed bridges in floodplain channels of anadromous fish streams due to the extensive spawning habitat that would be adversely impacted by crossing structures other than clear-span open-bottom culverts or bridges.

RED CATEGORY CULVERTS ACROSS ANADROMOUS FISH STREAMS

Of the 179 culverts in the RED category, 105 (59%) exhibited multiple causes of block fish passage: 53 culverts had two causes, 43 culverts had three, 8 culverts had four and 1 culvert had five.

Of the 74 culverts (41%) assumed not to be adequate for fish passage due to a single factor, unacceptably steep gradient was the most frequent cause. Of the 33 culverts with gradient as sole problem, 12 culverts had gradients less than 2% and 21 culverts had gradients between 2 and 11%. Further analysis of the twelve records with a gradient less than 2 % using FishXing software may be warranted to confirm the criteria used in the Fish Passage Evaluation Chart.

The following graphs display the frequency and reasons for culverts being assumed to block salmonid fish passage for a single reason. It is assumed that adult salmon can negotiate higher velocity water through a culvert and greater culvert perch heights as long as there is adequate water depth.

Figure 2. Anadromous fish streams: number of reasons for RED designation

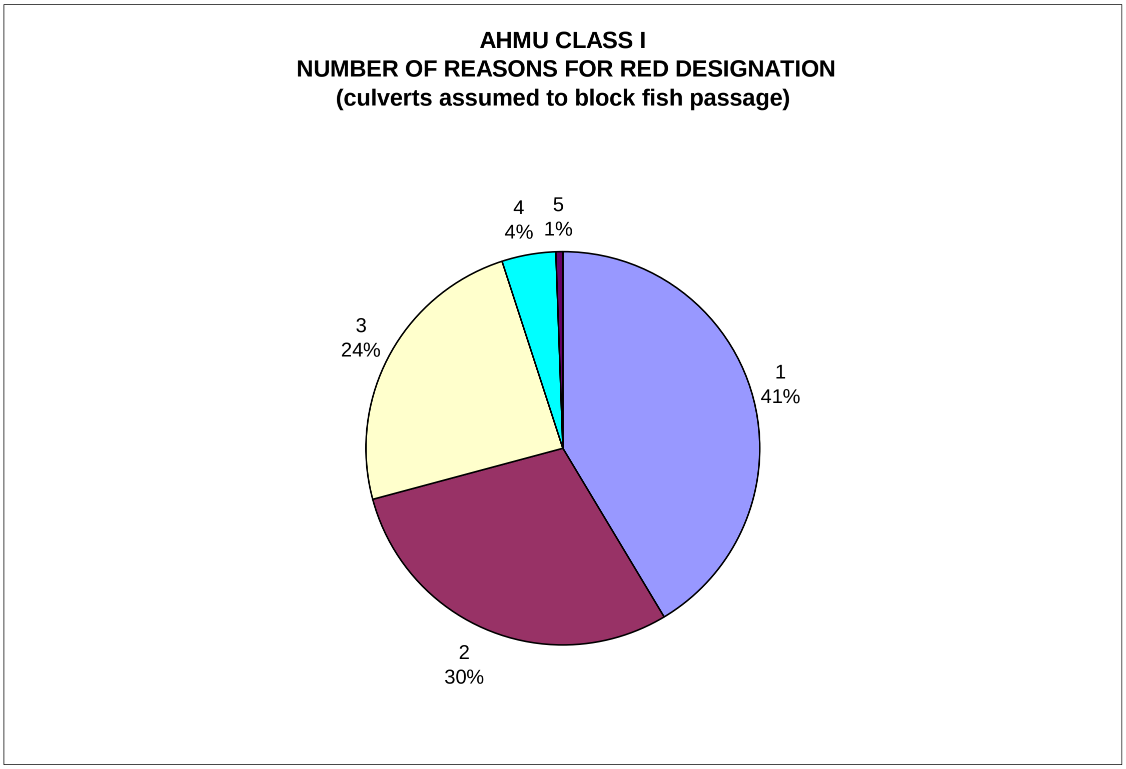
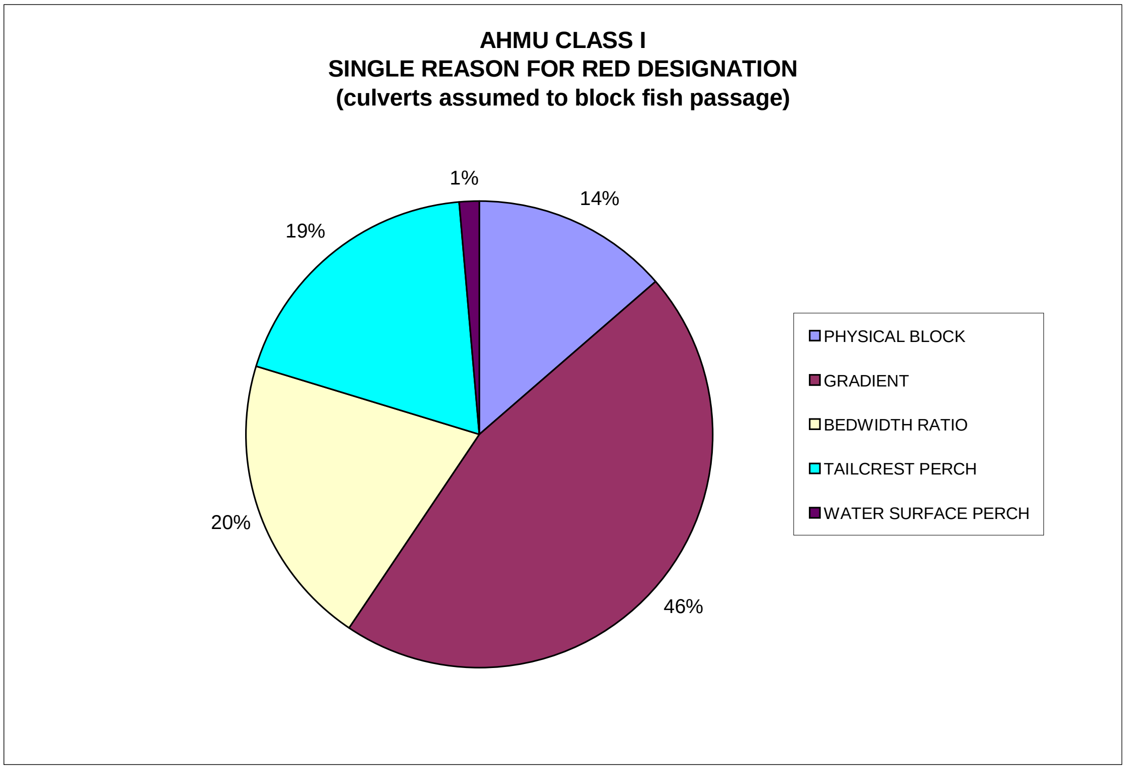


Figure 3. Anadromous fish streams: single reason for RED designation



RED CATEGORY CULVERTS ACROSS RESIDENT FISH STREAMS

Of the 531 Class II culverts in the RED category, 385 (73%) exhibited multiple causes of assumed blockage to fish passage: 120 culverts had two causes, 210 culverts had three, 53 culverts had four and 3 culverts had five. Of the 145 culverts (27%) blocked by a single factor, unacceptably steep gradient (65%) was the most frequent cause. Of the 95 culverts with gradient as the sole problem, 19 culverts had gradients less than 2% and 76 culverts had gradients between 2 culverts and 17%. Further analysis with FishXing of the nineteen records with a gradient less than 2 % may be warranted to confirm the criteria used in the Fish Passage Evaluation Chart. The following graphs display the frequency and reasons for assumed blockage to resident fish.

Figure 4. Resident Fish Streams: number of reasons for RED designation

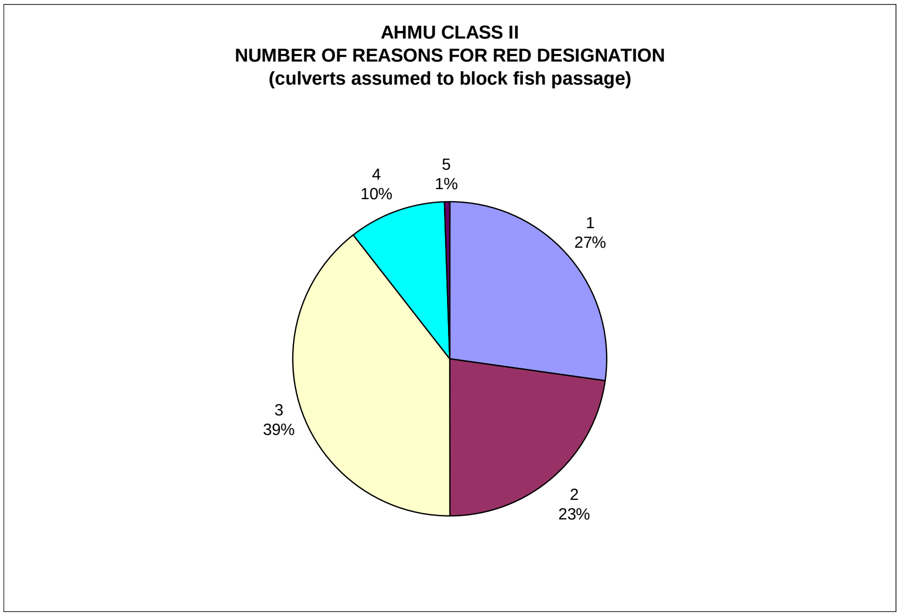
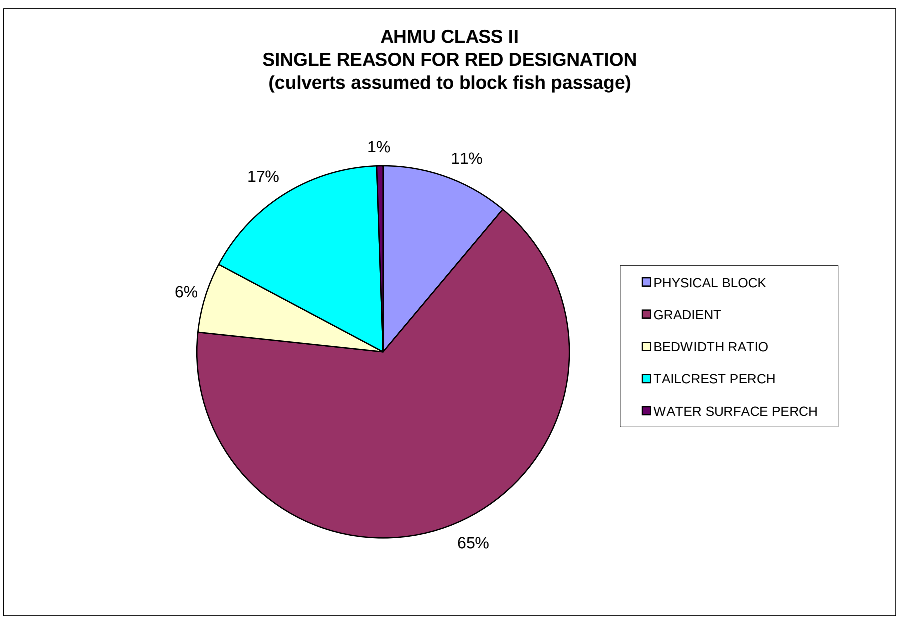


Figure 5. Resident fish streams: Single reason for RED designation



GREY CATEGORY

Of the 6 anadromous stream culverts in the GREY category, 3 culverts were due to a single criteria. Of the 55 resident fish stream culverts in the GREY category, 24 were due to a single criteria, with gradient being the most common (12 records).

GREEN CATEGORY

There were 83 culverts in the GREEN category, which were assumed adequate for fish passage. Forty-seven were on anadromous fish streams and 36 were on resident fish streams. The structure types included:

- 1 Structural Plate Pipe Arch
- 2 Corrugated Metal Arch - (open bottom)
- 70 Corrugated Metal Pipe (round)
- 10 Corrugated Metal Pipe Arch (squash pipe)

The diameter of round corrugated metal pipes assumed adequate for fish passage at the sites surveyed varied from 18” to 120”, with the following frequency:

- 6 18"
- 10 24"
- 21 36"
- 18 48"
- 8 60"
- 4 72"
- 2 96"
- 1 120"

Of the 47 anadromous fish culverts assumed to be adequate for fish passage, approximately one-third were verified to have been re-installations in more recent years, usually associated with the replacement of old log stringer bridges.

PERCHED CULVERTS

Tailcrest (See Glossary) was used to evaluate culvert perch height since it is independent of changes in streamflow. Water surface elevation at the tailcrest was also evaluated, but this measurement is dependent upon flow stage at the time of the survey. Forty-two culverts were recorded as having no "true" tailcrest. For these culverts, the measurement was taken at a distance three times the culvert diameter downstream of the culvert outlet. None of these culverts were put in the RED category solely because of the tailcrest perch; all exhibited multiple problems including excessive gradient, blockage, and bedwidth ratio or water surface elevation perch.

Perch height represented a restriction or a total block to efficient fish passage for 100 culverts on anadromous fish streams and 374 culverts on resident fish streams. For anadromous fish streams with a tailcest perch, 22 had a perch greater than 2 feet, 29 between 1 and 2 feet and 49 between 4 inches and 1 foot. For resident fish streams with a tailcrest perch, 108 had a perch greater than 2 feet, 134 between 1-2 feet and 132 between 4 inches and 1 foot.

BLOCKED CULVERTS

Blockages in culverts can be caused by excessive bedload, road fill material falling into culvert, woody debris or beaver activity. Of the126 culverts which recorded any degree of blockage and which recorded a "Failure Mechanism" or cause of the blockage, sediment accumulation (19), woody debris (14), beaver (14), mechanical failure (12) and road fill material (12) were the most frequently noted causes. There were 24 culverts on Class I streams with a blockage of 10% or more and 77 culverts on Class II streams with a blockage of 10% or more. Where these were minor or easily correctable, RCS crews removed the blockage during this project and noted this as action taken in the database. Culverts are often designed to accumulate bedload within the culvert to facilitate fish passage. This bedload deposition (if less than 30% of the area) was not considered a blockage. The data elements "Bedload Coverage" and "Culvert Bedload Type" were intended for culverts, which were designed to retain bedload, such as a depressed invert culvert.

STRUCTURE TYPE

Culverts in the RED category were sorted by the type and size of the structure. On anadromous fish streams, 126 (70%) of the culverts in the RED category were round corrugated metal pipes with diameters of 48" or less. These may be the most cost-effective culverts to replace or retrofit. It is unlikely that the 18" and 24" culverts were designed for fish passage. Most of the culverts less than 48" are on streams which currently are not in either the FS' GIS streams cover or ADF&G's Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes. This may indicate that inadequate field reconnaissance and fish verification was conducted prior to the design of the road and culverts. Another reason may have been the FS' previous policy of allowing the blockage of resident fish based upon their benefit cost analysis of individual stream crossing sites.

On resident fish streams, there are 426 (80%) of the culverts in the RED category that were round corrugated metal pipes with diameters of 48" or less. Again, many of these may be relatively easy to retrofit or repair. Some, however, are on steep gradients or beneath very deep fills and will consequently be quite expensive to restore efficient fish passage.

Table 3. - RED category anadromous fish stream culverts by type and size.

		Size (width)					
STRUCTURE TYPE	**Number**	**18"**	**24"**	**36"**	**48"**	**60"**	**> 60"**
Structural Plate Arch	2						2
Corrugated Metal Pipe - round	152	17	22	50	33	18	16
Multiple CMP	4			1	3		
CMP (squash pipe)	17			1	1	2	14
Multiple CMP (squash pipe)	4						4

Table 4. - RED category resident fish stream culverts by type and size.

		Size (width)					
STRUCTURE TYPE	**Number**	**18"**	**24"**	**36"**	**48"**	**60"**	**> 60"**
Structural Plate Arch	3						3
Corrugated Metal Pipe -round	479	60	120	147	99	32	21
Multiple CMP	26	1			15		
CMP (squash pipe)	21			1	3	4	13
Plastic Pipe	8	3	3	2			
Corrugated Metal Pipe - baffled	2					1	1
Corrugated Metal Arch - open	1						

There does not appear to be any difference in the size of round corrugated metal pipes between the RED and GREEN categories. Eighty percent of culverts in the RED category were 48" or less compared to 78 percent of the culverts in the GREEN category.

Bridges generally are believed to pass fish efficiently with relatively few exceptions. However, stream width above bridges was not recorded, and no detailed analysis of bridges has been completed since bridges have not been shown to limit fish migration.

SPECIAL SITE CONDITIONS

This data field identifies any conditions that predispose the stream crossing structure or road to causing future problems for fish habitat. The field also identifies the consequences of the problem. "Special Site Conditions" were noted on 57 anadromous fish stream culverts. Beaver activity (BV) was recorded 20 times, Other (OT) 8 times and the remaining 29 records noted factors such as "stream routed into ditch", "structural integrity of the road", "unstable woody debris upstream", "active bedload upstream" or "sediment transport potential into a fish stream". The category "Other" frequently included comments concerning the inability of the culvert to pass fish. There were 113 records of resident fish stream culverts with a "Special Site Condition" noted. Beaver activity (BV) was noted 45 times and the remainder of the comments were distributed similarly to those for the anadromous fish stream culverts. In addition, there were six anadromous fish stream culverts with a designated "Priority" as "E" (emergency) and seventeen as "C" (critical). For resident fish stream culverts, there was a total 24 "C" (critical) designations.

ACTION TAKEN

This data field is a way to record road maintenance accomplishments at the time of the survey. Action Taken was recorded for 9 anadromous fish stream culverts. Crews hand cleaned (HCC) 3 culverts and removed organic Blockages from six others.

A wider variety of corrective actions were recorded for resident fish stream culverts, with a total of 20. Organic blockages were removed from 9 culverts7 were hand cleaned, road fill material was removed from seven culverts, woody debris was removed from six, and beaver debris was removed from one.

ACTION REQUIRED

This data field identifies the degree of corrective action required to correct a problem noted during the survey. Action required was recorded for 55 anadromous fish stream culverts. The extent of action varied from "Moderate" (intensive hand labor can correct) to "Extensive" (use of heavy equipment is needed). Resident fish stream culverts had action required recorded for 140 culverts. However, there were many culverts in the RED or GREY category with this field left blank. In these cases, other data recorded allows an evaluation of the degree of action required. It can be assumed that any corrective action necessary to restore fish passage would at least be classified as "Moderate".

UPSTREAM HABITAT

The data element "HAB" (Fish Habitat) documents whether fish habitat was present immediately upstream or downstream of the stream crossing structure. Stream reaches with gradients greater than 25% were normally not considered fish habitat, consistent with the regulations regarding presumed barriers to fish that implement the Alaska Forest Resources and Practices Act. In streams with gradients less than 25%, the width, quantity and quality of pools, natural barriers, stream stability and proximity to known fish habitat were considered in addition to sampling for fish (which was recorded in a separate field).

There were very few culverts in the RED Category for which fish habitat was not recorded upstream. Of the 179 anadromous fish stream culverts in the RED Category, only 3 indicated that habitat was not present upstream, and upstream gradients appeared to verify this as 159 (90%) had upstream gradients of 10% or less.

Of the 622 resident fish stream culverts in the RED category, only 9 had gradients in excess of 25% and 308 had upstream gradients of 10% or less.

The total length, quantity, type and quality of upstream fish habitat above culverts assumed to be inadequate for fish passage were not specifically measured under this project. However, an estimation of fish habitat upstream may be possible by looking at contours that indicate where stream gradient likely exceeds 25%. The FS has begun field assessments of the fish habitat upstream of RED category culverts.

CULVERT BEDLOAD COVERAGE

Culvert bedload coverage refers to the percent of the culvert's length that is covered with bedload. Retention of bedload within culverts it is extremely important, since this increases the "roughness" and reduces the velocity of water flowing through the culvert. Culverts are often designed to accumulate bedload to facilitate fish passage; thus bedload deposition is not considered a blockage if it is less than 30% of the culvert height. Well-designed culverts are sized and buried to ensure both that bedload will be retained and that the remaining useable diameter of the culvert will handle flood flows and efficiently pass fish during the stream flow conditions when they would naturally be attempting to migrate through the culvert.

Only 24 anadromous fish stream culverts had 90% or more bedload coverage. All were in the RED category for a variety of other reasons.

- 10 due to blockage designation
- 8 due to gradient
- 8 due to perch (tailcrest)
- 7 due to culvert/bedwidth ratio

As with anadromous fish stream culverts, all 55 resident fish stream culverts with 90% or more bedload coverage were in the RED Category for a variety of reasons.

- 21 due to blockage designation
- 28 due to gradient
- 20 due to perch (tailcrest)
- 9 due to culvert/bedwidth ratio

Several reasons may account for the failure of culverts to retain bedload: 1) improper bedding (burial) during installation; 2) installation at too steep a gradient; 3) water often flows under and not through the culvert when culverts are not properly bedded, resulting in a potential low-flow barrier to fish passage; and 4) the substrate that was intended to cover the bottom of the culvert was not engineered, and natural substrate was used as backfill.

AGE OF THE STRUCTURE

Identification of the year that the road was constructed or the culvert installed was not possible due to varying degrees of records on each Ranger District. In addition, some culverts have been replaced one or more times with no record of when the replacement occurred. Data collection on newly designed and installed culverts (after the effective date of TLMP, May 23, 1997) is incomplete. Of the 47 Class I culverts in the Green category, one third were re-installations in more recent years primarily due to replacement of log stringer bridges.

LOG AND WOODEN CULVERTS

All but one log and wooden culvert evaluated in the assessment of fish passage on verified fish streams were located on Prince of Wales Island. Two log culverts and two wooden culverts were located on anadromous fish streams. These records were missing measurements necessary to evaluate fish passage; however, field notes indicate that half of the stream flow was passing through the road fill rather than the log culvert at one site. No other problems were noted with these culverts. Eight wooden culverts and five log culverts were located on resident fish streams. A few problems were noted at these sites:

- hydraulic flows exceeded capacity;
- stream routed into ditch;
- debris blockage; and

- culvert perch.

On five sites, the only upstream habitat was in the roadside ditch line. the Resident fish stream structures lacked necessary measurements needed to evaluate fish passage. This data should be collected in follow-up field efforts in 2000-2001.

BRIDGES

Bridges typically do not impede fish passage. A total of 189 bridges were identified in the RCS database. Insufficient information was collected to make an accurate evaluation as it was assumed all bridges were efficiently passing fish. Measurements were not taken because detailed information on bridges and major structures exists in engineering databases on each District. Upstream bedwidth and distance between abutments would need to be collected to conclusively determine if there are any fish passage concerns related to bridges.. Erosion of abutments, fill slopes and ditches adjacent to approaches may also become a problem for maintaining fish habitat even if there are no fish passage concerns.

DISPLACEMENT OF SPAWNING HABITAT FROM CULVERT LOCATION

Culverts typically should not be installed in stream locations containing spawning habitat. An estimation of the amount of habitat potentially displaced by culverts was made by querying the RCS data for the channel types present both upstream and downstream of the culvert. Floodplain channels are low gradient (< 2%) channels where alluvial deposition is prevalent and contain the highest percentage and highest quality of spawning habitat. Of 273 culverts on anadromous fish streams, only 5 were located on floodplain channels as the FS typically installed a bridge across floodplain channels in order to maintain anadromous fish spawning habitat. Of 622 culverts on resident fish streams, only 2 were located on floodplain channels. Moderate gradient/mixed control (MM) channels have gradients from 2 - 6% and are sediment transport oriented. They are second to floodplain channels in the potential of containing suitable spawning habitat. There were 123 culverts on anadromous fish streams and 198 culverts on resident fish streams located on MM channels. While MM channels often contain suitable spawning gravel, they are highly variable and it can not be assumed that every culvert installation may have displaced spawning habitat.

WATER QUALITY

High quality fish habitat is dependent upon maintenance of water quality. Sediment can have a detrimental effect upon fish habitat by reducing gravel permeability and entrapping alevins or fry. It also can affect channel shape, sinuosity and the relative balance between pools and riffles. The following section identifies RCS data elements that are associated with sediment sources and structures intended to control the movement of sediment. The proximity of a sediment source to a live stream gives an indication of the relative risk of the sediment reaching the stream.

Corrective action to minimize degradation of water quality may include:

- Seeding cut and fill-slopes
- Correcting inlet and outlet erosion with the placement of rip rap (large rock)
- Maintenance of ditches and catch basins
- Constructing water bars at surface erosion locations
- Removing blockages from drainage structures

DITCH EROSION AND DITCH PLUGGING

The purpose of a ditch is to transport precipitation that has fallen directly on the road surface and subsurface flow upslope of the road to a natural stream or drainage point before it has a chance to concentrate and erode the road prism. The ditch must allow the water to achieve sufficient velocity to transport sediment but not so much velocity that ditch erosion becomes a problem. Cross drains (small culverts, usually 18" in diameter) must be installed frequently enough to avoid accumulation of water and the buildup of velocities sufficient to cause erosion of the ditch or the area below the outlet of the cross drain. Failure to maintain both the ditch and the cross drain can lead to more serious problems with structural integrity of the road prism and present an even greater risk to water quality.

Two descriptive parameters in the RCS are designed to describe the condition of ditches: ditch erosion location (DE) and ditch plugging event (DP). Ditch plugging was identified at 1434 locations and ditch erosion at 64. Most of these locations identified a failure mechanism, which led to the problem. Table 3 lists the failure mechanism and the number of times it was recorded.

Table 5 - Failure mechanism for ditch erosion (DE) and ditch plugging (DP)

FAILURE MECHANISM	**DE**	**DP**
BLOCKED DITCH		10
CULVERT TOO SHORT(usually due to road widening)		11
CUT-SLOPE SLUMPING OR SLIDING INTO CULVERT		4
CUT-SLOPE SLUMPING OR SLIDING INTO DITCH		133
HYDRAULIC FLOWS EXCEEDED CULVERT CAPACITY	26	
FILL SLUMP OR SLIDE		5
MISSING OR INADEQUATE DITCH (blasting required)		25
MISSING OR INADEQUATE DITCH (diggable material)		341
NONE NOTED	14	743
OVERSTEEPENED SLOPES		2
OTHER	6	2
ROAD FILL (pushed off road by grader)	1	37
NATURAL STREAM NOW N DITCH	12	2
SEDIMENT ACCUMULATION IN CULVERT	1	
SEDIMENT ACCUMULATION IN DITCH	4	64
WOODY DEBRIS IN CULVERT		2
WOODY DEBRIS IN DITCH		64

DITCH RELIEF CULVERTS

A total of 13,834 ditch relief culverts (cross drains) were recorded in the RCS database, with 2171 (16%) having a blockage of 10% or more. Varying degrees of maintenance was performed on 299 of the culverts. The following table summarizes the number and types of maintenance done:

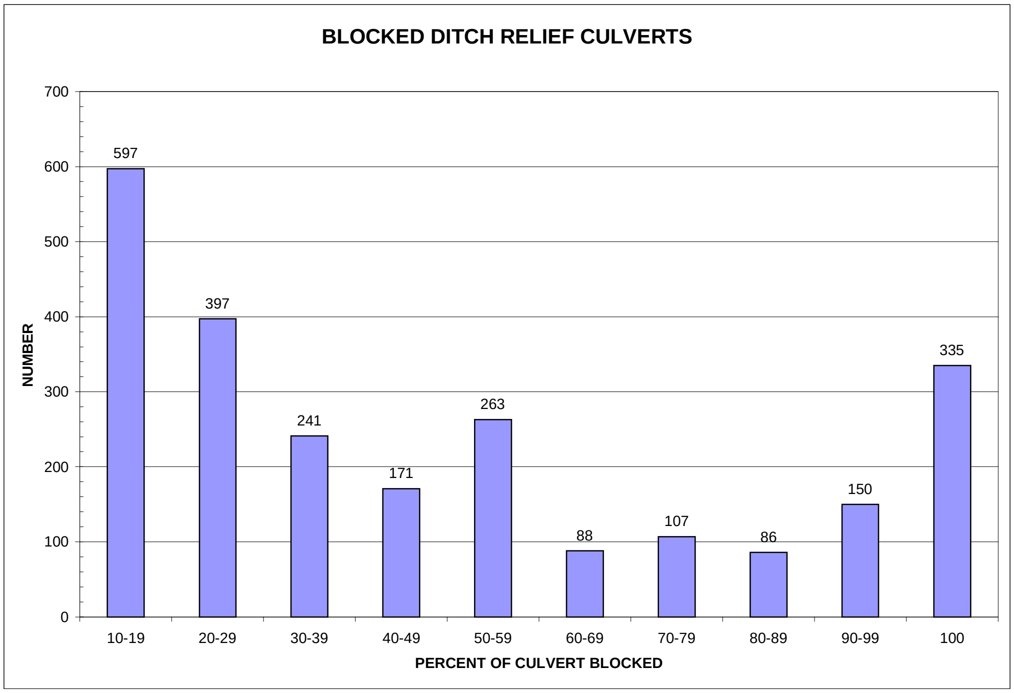
Table 6. - Maintenance activity at ditch relief culverts

MAINTENANCE ACTIVITY	**NUMBER**
Sediment removed from culvert (SED)	15
Fill material removed from culvert (RFL)	99
Organic blockage removed from culvert (ORG)	68
Catch basin cleaned (BSN)	13
Bedload deposition removed from culvert (BDL)	18
Hand cleaned culvert (HCC) *	86

* Hand cleaned culvert was only used in 1998 and was replaced with more specific codes

The following graph displays the number of blocked ditch relief culverts grouped by percent blocked:

Figure 6- Number of blocked ditch relief culverts by percent blocked



CUT-SLOPE AND FILL-SLOPE EROSION

New road construction creates cut-slopes (uphill) and fill-slopes (downhill) along the road, which can generate large amounts of sediment if not properly stabilized with seeding. Even if seeded immediately, slumps or slides can expose highly erodible soils, which may potentially present a risk to water quality and fish habitat.

Cut-slope erosion was recorded at 1501 locations and fill-slope erosion at 240 locations. The data element "Failure Mechanism" was intended to cover a wide variety of road and culvert features. Therefore, not every failure mechanism is appropriate to be used for all data elements.

Table 7. – Cut-slope (CE) and fill-slope (FE) erosion causes

FAILURE MECHANISM	CE	FE
BLOCKED DITCH	3	1
BEAVER ACTIVITY		1
CULVERT TOO SHORT	27	3
CUT-SLOPE SLUMPING INTO CULVERT	39	
CUT-SLOPE SLUMPING INTO DITCH	305	
FILL SLUMP OR SLIDE	8	103
MISSING OR INADEQUATE DITCH (blasting required)		2
MISSING OR INADEQUATE DITCH (diggable material)	1	2
MATERIAL INADEQUATE FOR DESIGN	2	2
NO FAILURE MECHANISM NOTED	736	99
OVER-STEEPENED SLOPES	343	17
OTHER	6	
ROAD FILL (pushed off road by grader)		1
ROAD GRADE NEEDS CROWNING/SHAPING	1	
SIDE CAST MATERIAL CRACKING OFF ROADWAY		4
SEDIMENT ACCUMULATION IN CULVERT	2	
SEDIMENT ACCUMULATION IN DITCH	22	1
SUBSIDENCE	3	1
WOODY DEBRIS IN CULVERT		1
WOODY DEBRIS IN DITCH	3	
WEATHERING OR CORROSION		2

Over-steepened slopes and cut-slope slumping or sliding into the ditch were most frequently associated with cut-slope erosion. Fill slump or slide was most frequently associated with fill- slope erosion.

ROAD SURFACE EROSION

The descriptive parameter "Surface Erosion" (SE), which identifies erosion of the road surface, was recorded at 675 locations. "Water Running Across Road" (WR) was noted 422 times. The failure mechanism attributed most was "Missing or Inadequate Ditch" (MDD) where there was diggable material. Blasting would be required to reconstruct the ditch at only 14 of these problem sites. Field crews noted that waterbars were needed or not functioning properly in many cases. Since waterbar problems occurred so frequently, we recommend adding a code for waterbar to "Failure Mechanism" for future surveys. Appendix E contains a listing of the failure mechanism and frequency of occurrence.

CATCH BASINS

Catch basins trap sediment that would otherwise be transported down the ditch line during high flows. Through time, they tend to fill with sediment, and require periodic cleaning. The data element "Catch Basin" records the conditions present at the time of the survey. If the catch basin was cleaned at the time of the survey, this activity was recorded under the data element Action Taken. The data elements "Action Required" and "Priority" provide additional information regarding needed maintenance. The following table displays the condition of the catch basins surveyed along with the frequency of the condition:

Table 8. - Condition of catch basins

CATCH BASINS			
CODE	**DESCRIPTION**	**NUMBER**	**PERCENT**
N	No Catch Basin and none needed	646	5
I	Catch Basin intact and functioning	7906	66
B	Building or rebuilding of catch basin required	730	6
M	Cleaning of catch basin required	2767	23
TOTAL		12049	100

Catch basins were intact and functioning at 66% of the culverts, required cleaning at 23%, needed building or rebuilding at 6% and catch basin were not needed at 5%.

DITCH BLOCK

The purpose of a ditch block is to divert surface water from the ditch into a cross drain or ditch relief culvert.

5176 of the total 6276 recorded ditch blocks were intact and functioning. Establishment of a new ditch block was identified in 746 instances, and maintenance of ditch block required was recorded 334 times. The code N (No ditch block and none needed) was never recorded.

CULVERT INLET EROSION

Culvert inlet erosion can be caused by an undersized culvert, poor alignment, culvert blockage, inadequate armoring, or improper road fill material. This can result in the degradation of downstream fish habitat, creation of fish passage barrier with a perched inlet or road failure.

Table 9. - Culvert inlet erosion

CODE	DESCRIPTION	NUMBER	PERCENT
F	Fill Slope erosion protection needed (rip rap or other)	215	31
I	Inlet conditions improvements needed (flare inlet, etc)	252	36
B	Bank protection needed at upstream banks (rip rap)	157	23
O	Other (specify in notes)	45	6
Y	Yes (obsolete code)	24	4
Total		693	100

Over half (369) of the "Inlet Erosion" locations were on stream crossings. 45 anadromous fish stream culverts and 86 resident fish stream culverts exhibited inlet erosion. The remainder of the inlet erosion was associated with ditch relief culverts.

Corrective action should be a priority at these sites and are listed in Appendix E by District, Road Number and Milepost.

CULVERT OUTLET EROSION

Culvert outlet erosion can be caused by an undersized culvert, poor alignment, inadequate armoring, or improper road fill material. This can result in the degradation of downstream fish habitat, creation of fish passage barrier with a perched outlet or road failure.

Table 10. - Culvert outlet erosion

CODE	DESCRIPTION	NUMBER	PERCENT
F	Fill Slope erosion protection needed (rip rap or other)	351	55
D	Energy dissipater or outlet pool needed	46	7
B	Bank protection needed at upstream banks (rip rap)	108	17
O	Other (specify in notes)	109	17
Y	Yes (obsolete code)	25	4
Total		639	100

Over half (329) of the "Outlet Erosion" problems were at stream crossings. 35 anadromous fish stream culverts and 101 resident fish stream culverts had outlet erosion. The remaining problems were associated with ditch relief culverts.

Corrective action should be a priority at these sites and are listed in Appendix E by District, Road Number and Milepost.

LOG AND WOODEN CULVERTS

A total of 123 log and 81 wooden culverts were used on non-fish streams and as ditch relief culverts. Log and wooden culverts were used on 42 ditch relief culverts and 162 water quality streams. All but 6 of the structures were located on Prince of Wales Island. 41 log culvert (33%) and 53 wooden culverts (65%) exhibited a variety of problems and failures such as collapse, rotting, blockage, and where replacement with a corrugated metal pipe was recommended. Replacement of these structures should be made a priority due to the high failure rate.

FAILURE MECHANISM FOR ROAD CROSS SECTIONAL FEATURES

The descriptive parameters were queried for the failure mechanism that led to each problem. For "Cut-slope Erosion", over half of the records noted a failure mechanism. "Over-Steepened Slopes" (OS) accounted for 26% of the failures and "Cut-slope Slumping or Sliding Into The Ditch" (CSD) created 21% of the failures.

For "Fill-slope Erosion", over 60% of the records noted a failure mechanism, with "Fill Slump or Slide" (FS) occurring 44% of the time.

For "Surface Erosion", 70% of the records noted a failure mechanism with "Missing or Inadequate Ditch - Diggable Material" (MDD) occurring 28% of the time a mechanism was noted. "Sediment Accumulation In Ditch" (SDD), "Sediment Accumulation in Culvert" (SDC) and "Road Grade Needs Crowning/Shaping" (RG) were also frequently noted for a cumulative total of 17% of the time when a failure mechanism was noted.

For Water Running Across Road, 90% of the records noted a failure mechanism with "Missing or Inadequate Ditch - Diggable Material" (MDD) being the most frequent, occurring 34% of the time a mechanism was noted. "Road Grade Needs Crowning/Shaping" (RG) was the second most frequent failure mechanism, occurring in 14% of the records.

"Ditch Plugging" was recorded as the "Descriptive Parameter" at 1199 sites with failure mechanisms noted for 60% of the records. "Missing or Inadequate Ditch - Diggable Material" (MDD) was the most frequent, occurring at 28% of the sites.

QUARRY FEATURES

The database contains 1148 quarry features, most of which just identify the location. There were 46 "Cut-Slope Erosion", 33 "Quarry Erosion" and 40 "Water Running Across Quarry", locations identified. The failure mechanism most commonly associated with "Cutslope and Quarry Erosion" was "Over-Steepened Slopes". Spatial analysis in GIS (ArcView) is recommended to further evaluate the proximity of these erosion locations to waterbodies and fish habitat.

BMP EFFECTIVENESS

Best Management Practices (BMPs) are "methods, measures or practices to prevent or reduce water pollution, including but not limited to, structural and nonstructural controls, operation and maintenance procedures, other requirements and scheduling and distribution of activities. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on a basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility" (Chapter 2, EPA Water Quality Standards Handbook).

To comply with State water quality standards, the FS applies BMPs that are "consistent" with the Alaska Forest Resources and Practices Act (AS 41.17) and applicable State water quality regulations. In recognition of the importance of BMPs, they are identified as one portion of the "Forest Service Alaska Region Water Quality Management Plan," as described in the USDA Forest Service/Alaska Department of Environmental Conservation Memorandum Of Agreement (1992). (TLMP, 1997)

Analysis of RCS data indicates that several BMPs are not being fully implemented during the maintenance phases on FS roads. Primarily these problems are associated with road maintenance. Of particular concern is BMP 14.7,14.8, 14.9, 14.12, 14.17 and 14.20. The RCS found 2171 (16%) ditch relief culverts with a blockage of 10% or more. 2767 sediment catch basins required cleaning, and an additional 730 catch basins needed to be built or rebuilt. Cut-slope and fill-slope erosion was noted at 1539 locations. Inlet and outlet erosion was noted at 1332 culverts, over half of which were stream crossings.

Locations in close proximity to streams and those with inadequate ditch blocks present the greatest risk to water quality. The large number of fish crossing culverts in the RED category (179 Class I and 351 Class II) are also of concern in the implementation of BMP 14.17.

The following is a list of BMPs relating to road construction with a discussion of the RCS data elements associated with each.

BMP'S RELATING TO ROAD CONSTRUCTION

BMP 14.3 Design of Transportation Facilities
Objective: To incorporate site specific soil and water resource protection measures into the design of roads and trails.

BMP 14.5 Road and Trail Erosion Control Plan
Objective: Develop Erosion Control plans for road or trail projects to minimize or mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities. Ensure compliance through contract administration and timely implementation of erosion control measures.

BMP 14.7 Measures to Minimize Mass Failures
Objective: To minimize the chance and extent of road-related mass failures, including landslides and embankment slumps.

The data elements "Cut-slope and Fill-slope Erosion" identify sites where preventive actions may have failed to minimize erosion from mass failures. "Failure Mechanism" also provided valuable information in identifying the cause of the failure.

BMP 14.12 Control of Excavation and Sidecast Material
Objective: To implement measures to reduce sedimentation from unconsolidated excavated and sidecast material caused by road construction, reconstruction, or some other maintenance activities.

Cut and fill slope erosion and inlet and outlet erosion are associated with this BMP

BMP 14.17 Bridge and Culvert Design and Installation
14.17 **Objective: To minimize adverse impacts on water quality, streamcourses, and fisheries resources from the installation of bridges, culverts or other stream crossings.**

All data elements and measurements associated with culverts and fish presence provide information useful in evaluation of this BMP.

BMP 14.18 Development of Gravel Sources and Quarries
Objective: To minimize sediment from borrow pits, gravel sources, and quarries, and to limit channel disturbance from gravel sources permitted for development within flood plains.

The "Descriptive Parameter" Quarry Erosion or Surface Erosion associated with the "Quarry Feature" provides information related to this BMP.

BMP 14.8 Measures to Minimize Surface Erosion
Objective: To minimize the erosion from cutslopes, fillslopes, and the road surface and consequently reduce the risk of sediment production.

BMP 14.9 Drainage Control to Minimize Erosion and Sedimentation
Objective: To minimize the erosive effects of concentrated water flows from transportation facilities and the resulting degradation of water quality through proper design, and construction of drainage control systems.

The data elements "Blockage", "Ditch Block" and "Failure Mechanism" and "Inlet and Outlet Erosion" provided information relating to BMP 14.9.

BMP 14.20 Road Maintenance
Objective: To maintain all roads in a manner which provides for soil and water resource protection by minimizing rutting, road prism failures, side-casting and blockage of drainage facilities.

This analysis identified several areas where corrective action is recommended.

- Ditch erosion and ditch plugging locations
- Ditch blocks and catch basins requiring maintenance activities
- Blocked ditch relief culverts
- Cut-slope and fill-slope erosion locations
- Road surface erosion locations
- Culvert inlet and outlet erosion

In addition the data element "Action Taken" identified locations where corrective action was taken.

BMP 14.22 Access and Travel Management
Objective: To control access and manage road use to reduce the risk of erosion and sedimentation from road surface disturbance especially during the higher risk periods associated with high runoff and spring thaw conditions.

The data element "Access and Travel Management" (ATM) identifies the feature that blocks, closes or influences travel on the road. This analysis did not evaluate road access; however, the information exists in the database and is available for future queries should they be needed. Information related to chronic sedimentation, recurring maintenance problems and fish passage issues will assist in determining the costs related to keeping specific roads open.

DISCUSSION

ACCOMPLISHMENTS

The Road Condition Survey (RCS) protocol has served as an excellent tool to identify and prioritize fish passage and water quality problems associated with roads and drainage structures. A key factor in the success of the protocol is that it combines biological and engineering elements into a single database for use by both disciplines. Many culverts have been identified which are assumed to be restricting movement of fish and require corrective action. The FS has been using the RCS data to select restoration work through a program known as Choosing by Advantage. This has resulted in an additional $500,000 in road maintenance funds for the Tongass for each of the past two years. It will also serve as an excellent tool to track corrective action and maintenance over time.

Fish verification information collected during the course of the surveys will improve the accuracy of the FS' GIS streams cover and the Alaska Department of Fish and Game's "Atlas to the Catalog of Waters Important For Spawning, Rearing or Migration of Anadromous Fishes".

DATA LIMITATIONS

The database used for this analysis represents 2153 miles of permanent roads, or 60% of the total of 3594 miles of permanent roads on the Tongass National Forest. While this project was initially designed to sample proportionally across all districts, logistical practicability resulted in more effort occurring on certain Ranger Districts in the first three years. This change from a random sample approach to a census was possible due to the FS' commitment to complete the Road Condition Survey of permanent roads of the Tongass National Forest in the near future. They expect to complete it by 2002.

There was fairly proportionate data collection on the Ketchikan and Stikine Areas, which have approximately 69% of the system roads on the Tongass National Forest. The Chatham Area data represents 27 % of the system roads in that Area. Appendix E contains a summary of road miles by Ranger District.

There is insufficient information at this time to estimate the quantity or quality of habitat upstream of culverts that may be impacting fish passage (GREY) or are assumed not to be adequate for fish passage (RED). This type of information is key to the prioritization of projects to restore fish habitat and passage across the Tongass.

Some spatial analyses that were intended to be conducted using the FS' GIS system were not possible prior to the end of this project because the routed roads coverage had not been completed by the FS.

As noted earlier, 35% of the structures on Class I (anadromous fish) and Class II (resident fish) streams require additional field work to complete the measurements required in the revised protocol. This is a very high priority, since fish passage for these structures cannot be analyzed until the data set is completed. This data is expected to be collected by the FS over the next year.

PROGRAMATIC RECOMMENDATIONS

Despite the substantial knowledge about juvenile fish movement and passage, more knowledge is needed in some specific areas. Assessment of juvenile coho swimming capability through various types of culverts in natural field conditions is necessary to verify the assumptions used in mathematical predictions during culvert design. Some culvert design assumptions are based upon studies of species not native to the Tongass.

Additional information is needed on the migration timing of juvenile fish to determine if the State of Alaska's Q2-2 day duration flow is an appropriate standard. More field research is needed on the biological implications of a more frequent or longer delay in fish migration through a culvert. Additional regional data is needed on the migratory habits of fish in high gradient, headwater streams and of salmonid fry as they emerge from their redds in the spring and their movements during the summer.

Eighty-one percent of all culverts in the RED category are 48 inches or less in diameter. Most of these are on streams that are not in the FS' GIS streams or the ADF&G's Atlas to the Catalog of Waters Important For Spawning, Rearing or Migration of Anadromous Fishes". This suggests that streams can easily be incorrectly classified as non-fish streams in the absence of adequate field sampling data by qualified staff at the appropriate times of year for the expected species. In addition, the FS has recently increased their commitment to provide fish passage on resident fish streams compared to the past (see Introduction).

While this three-year project is complete, much additional work is needed to fully complete the Road Condition Survey, restore efficient fish and implement protocols for other aspects of fish passage and non-point source pollution control on the Tongass National Forest. The following list includes recommended follow-up work directly related to this project and completion of the Road Condition Survey:

- Complete road condition survey of permanent and temporary roads;
- Collect additional measurements needed to complete analysis of fish passage for RED and GREY culverts with verified fish presence and evaluate the structures (see Appendix E which identifies these culverts by Road Number and Milepost);
- Conduct upstream fish habitat assessments in the field to document quantity and quality of habitat above culverts assumed not to be adequate for fish passage (RED category);
- Prioritize corrective action for culverts in the RED category and seek additional road maintenance funds to ensure problems are corrected in a timely manner;

- Conduct additional GIS spatial analyses to determine the proximity of documented road erosion features to streams and drainage structures that are isolated due to road closures;
- Prioritize work to correct blocked culverts on non-fish streams and ditch and erosion problems contributing to nonpoint source pollution;
- Use the RCS data to update the FS' GIS streams coverage and ADF&G's Catalog of Waters Important for Spawning, Rearing and Migration of Anadromous Fishes. Where data is inadequate to add specific stream segments to the Catalog, verify fish presence in the field;
- Provide each ADF&G Area Office and each FS Ranger District with an Arcview database of the results of the Road Condition Survey and train field staff how to query for road and culvert features;
- Update the Road Condition Survey database annually, or when additional information is available;
- Verify in the field that fish passage is restricted or totally blocked at a random sample of culverts assumed not to be adequate for fish passage by documenting movement of various age juveniles and adults through culverts at different levels of stream flow; and
- Use the results of this project to improve the design criteria for stream crossings intended to provide efficient fish passage.

SITE-SPECIFIC RECOMMENDATIONS

Analysis of the RCS data has identified culverts assumed to not be adequate for fish passage, thereby restricting the natural movement of fish. This project also identified numerous sites where corrective action is needed to allow cross drains and ditches to function properly. Appendix E contains a list of culverts in the RED category, which require corrective action to restore fish passage. Also included in Appendix E are tables listing structures requiring maintenance activities to correct blockages, clean catch basins, correct inlet and outlet erosion and those needing additional measurements to evaluate fish passage (i.e., GREY category).

On anadromous fish streams there are 123 round corrugated metal pipes (69%), 48" or less in diameter in the RED category. On resident fish streams there are 453 round corrugated metal pipes (85%), 48" or less in diameter, in the RED category. These culverts may be the most cost effective to correct due to their size.

CONCLUSION

We are uncertain how long older stream crossing structures that are assumed to be adequate for fish passage today will continue to ensure safe passage. It is important to keep good records on all stream crossing structures to track their success or failure to provide efficient fish passage. These records can also document the total cost of a stream crossing structure over its life, including installation, maintenance and replacement. The "functional" life of a structure with respect to efficient fish passage is likely shorter than the period over which it continues to perform hydraulically. This may not be apparent to the casual observer, or even to all biologists and engineers, since rather small increases in flow velocity, partial blockages and perching of the culvert may prevent passage by juvenile or adult fish at high or low flows. The best way to ensure long-term fish passage is to design and install the structure properly and then monitor its condition regularly in order to achieve required maintenance in a timely manner. Even with an adequate design at the time of installation, unanticipated changes in watershed hydrology, stream course locations and other natural or man-caused events may dramatically change the ability of the structure to provide efficient fish passage.

GLOSSARY

AHMU. Aquatic Habitat Management Unit.

Anadromous fish. Fish which mature and spend much of their adult life in the ocean, returning to inland waters to spawn. Salmon and steelhead are examples.

Anadromous Fisheries Habitat Assessment. An assessment conducted in 1994 within the Tongass National Forest (published in 1995) to study the effectiveness of current procedures for protecting anadromous fish habitat and to determine the need for any additional protection.

Baffle. Wood, concrete or metal mounted in a series on the floor and/or wall of a culvert to increase boundary roughness and thereby reduce the average water velocity in a culvert or to retain bedload within the culvert.

Bankfull width. The width of the wetted channel when the water surface is at the same elevation as the active floodplain.

Bedload. The part of sediment transport not in suspension consisting of coarse material moving on or near the channel bed.

Bed Roughness. Irregularity of streambed material (i.e. gravel, cobbles) that contributes resistance to streamflow. Commonly measured as Manning's roughness coefficient.

Best Management Practices (BMPs). Land management methods, measures or practices selected by an agency to meet its non-point source control needs. BMPs include, but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility. BMPs are found in Forest Service Handbook 2509.22.

Classified road. A road constructed or maintained for long-term highway vehicle use.

Cross drain. A culvert which transports water from a ditch to the down-slope side of the road.

Culvert. A conduit or passageway under a road, trail, or other obstruction. A culvert differs from a bridge in that it is usually constructed entirely below the elevation of the traveled way.

Ditch Relief. A cross drain culvert, which transports water from a ditch to the down-slope side of the road.

Ditch Block. An obstruction in a ditch which blocks the movement of surface waters in a ditch and diverts it into a cross drain or ditch relief culvert.

Fish Passage. The ability of both adult and juvenile fish to move both up and down stream.

GIS. Geographic Information System.

Invert. The lowest point of the internal cross section of culvert or pipe arch.

Large Woody Debris (LWD). Any piece of relatively stable woody material, having a diameter of four inches or greater and a length greater than three feet, that intrudes into a stream channel. Formerly called large organic debris.

Ordinary high water mark. The mark along the bank or shore up to which the presence and action of the nontidal water are common and usual, and so long continued in all ordinary years, as to leave a natural line impressed on the bank or shore and indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics. (Consult 11 AAC 53.900 — Alaska Code.)

Palustrine Channel. Very low gradient (< 1%) streams associated with low relief landforms and wetland drainage networks. Water movement is slow and sediment transport is low. These channel types typically act as sediment traps and storage areas for fine organic and inorganic sediments. Beaver activity is often associated with these channels.

Perching. The tendency to develop a falls or cascade at the outfall of a culvert due to erosion of the stream channel downstream of the drainage structure.

Pipe. A culvert that is circular (round) in cross section.

Pipe Arch. A pipe that has been factory-deformed from a circular shape such that the width (or span) is larger than the vertical dimension (or rise).

Resident fish. Fish that are not migratory and complete their entire life cycle in fresh water.

Road Maintenance Level. Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (FSH 7709.58, section 12.3).
Maintenance Level 1. Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period is one year or longer. Basic custodial maintenance is performed.
Maintenance Level 2. Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration.

Maintenance Level 3. Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities.
Maintenance Level 4. Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds.
Maintenance Level 5. Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane and paved, or aggregate surfaced with dust abatement.

Roadbed. The graded portion of a road between the intersection of subgrade and side slopes, excluding that portion of the ditch below subgrade.

Scour. Localized erosion caused by flowing water.

Stream class. A means to categorize stream channels based on their fish production values. There are four stream classes on the Tongass National Forest. They are:

> Class I. Streams and lakes with anadromous or adfluvial fish habitat; or high quality resident fish waters listed in Appendix 68.1, Region 10 Aquatic Habitat Management Handbook (FSH 2609.24), June 1986; or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish.
>
> Class II. Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-5 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.
>
> Class III. Perennial and intermittent streams with no fish populations but which have sufficient flow or transport sufficient sediment and debris to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bankfull widths greater than 5 feet and are highly incised into the surrounding hillslope.
>
> Class IV. Intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope.
>
> Non-streams. Rills and other watercourses, generally intermittent and less that 1 foot in bankfull width, little or no incision into the surrounding hillslope, and with little or no evidence of scour.

Substrate. Mineral or organic material that forms the bed of the stream.

System Roads. (Classified) are permanent or Classified roads on the Tongass National Forest. System roads in Region 10 are designed with consideration for resource protection, legal obligations, total cost and the importance of the road. As a general rule, the USFS, Region 10 Best Management Practices (BMPs) recommend that bridge crossings for system roads be designed to pass not less than a 50-year to a 75-year flood. Culverts for Class I, II, and III streams are recommended to be designed to pass not less than a 25-year to a 50-year flood. The American Fisheries Society (Furniss et al. 1991) recommends a 100-year flood as the minimum for bridges and large culverts and a minimum 50-year flood for other drainage structures. Best Management Practices guidelines allow a greater risk of degradation to fish habitat than do standards designed specifically for fish habitat protection.

Tailcrest. A deposition of bedload or larger substrate downstream of the culvert, which controls the water level inside the culvert.

Temporary roads. (Unclassified) are roads which are anticipated to be utilized only for the duration of timber sale activities and are not designed to as high of an engineering standard as are system roads. Because of the temporary nature of these roads (often intended to be used for less than one year) investments in stream crossings structures and road surfacing are much less than are similar investments in system roads. These temporary roads may create greater short-term risks to fish habitat than do system roads. They may also create greater long-term risks when cumulative effects are considered or roads are not properly closed out after timber harvest has been completed.

Unclassified road. A road that is not constructed maintained, or intended for the long-term highway vehicle use, such as roads built for temporary access and other remnants of short-term-use roads associated with fire suppression; timber harvest; and oil, gas or mineral activities; as well as travel-ways resulting from off-road vehicle use.

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FOREST SERVICE HANDBOOK
Juneau, Alaska

FSH 7709.58-99-2
TRANSPORTATION SYSTEM MAINTENANCE HANDBOOK

INTERIM DIRECTIVE: 7709.58-99-2

EFFECTIVE DATE: July 2, 1999

EXPIRATION DATE: December 1, 2000

CHAPTER: 10 - MAINTENANCE OF FOREST DEVELOPMENT ROADS

POSTING NOTICE: The last R-10 ID was 7709.58-99-1 to chapter 10.

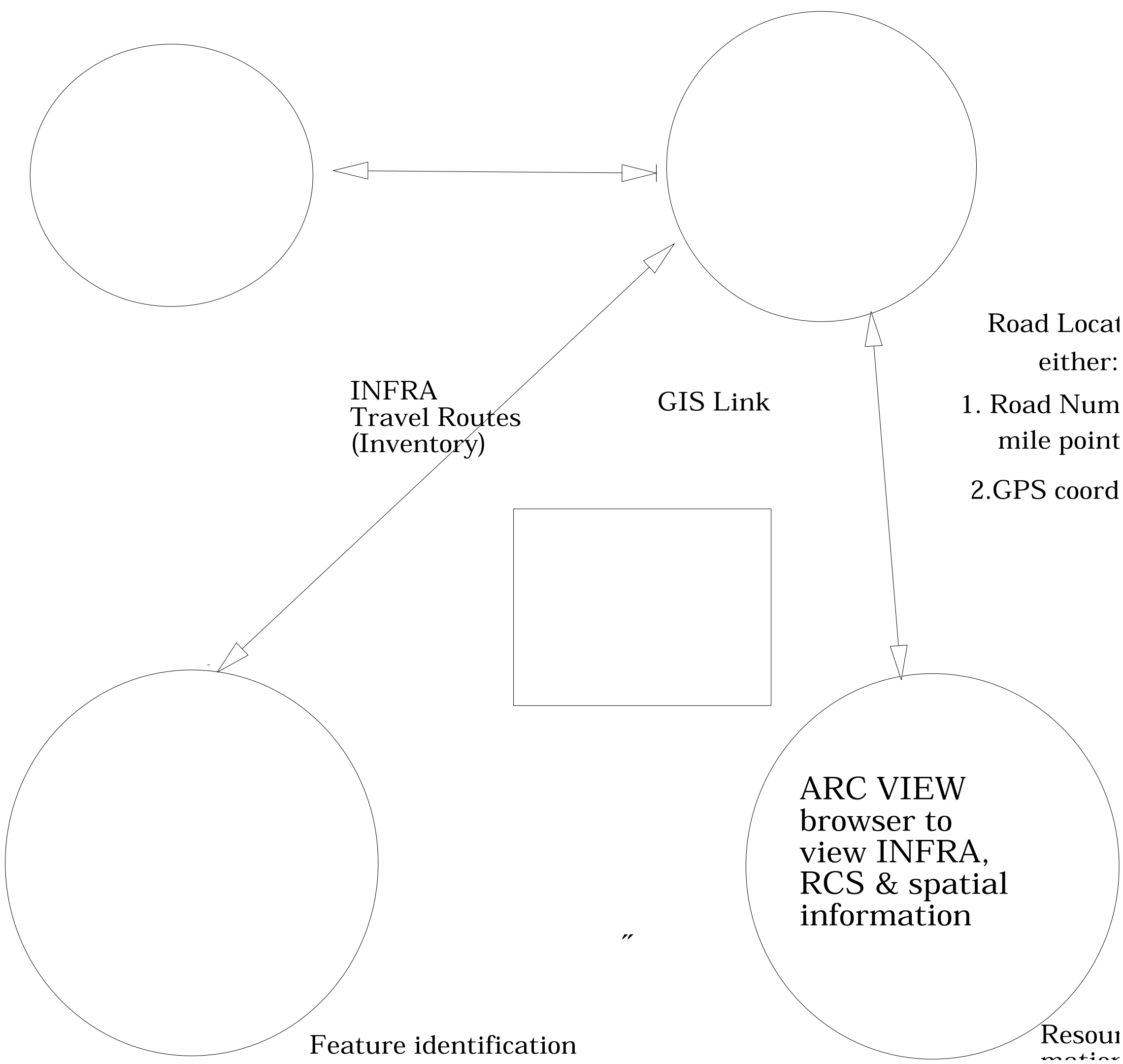
REMOVE: R-10 ID 7709.58-99-1 in its entirety.

This Interim Directive updates the road condition survey protocols to better match interagency processes for fish passage through culverts. The data has been reordered so field crews need only record observations of conditions and measurements taken in the field. Information processing procedures are included including the final formats. The intent to use the road condition data to provide historical information through ArcView interfaces is described.

/s/ James A. Caplan for
RICK D. CABLES
Regional Forester

12.5 - Condition Surveys. Road condition surveys are methods of determining the status and from that information deriving the maintenance needs for roads. Condition surveys provide information for 1) identification of maintenance trends, 2) problems analysis, and 3) priority setting for work scheduling and funding.

The Road Condition Survey data is designed to function within ArcView with full integration of GIS spatial coverages. With the use of geographic information systems (GIS) to assist in integration of inventory, spatial data, and related resource information, road condition surveys and related data can be used in many new and different ways. With GIS you can relate locations, features, and resource information.



1. Road Condition Survey Field Collection of Data (Section 1). Road condition survey field data is anticipated to be tabular formatted information. Each piece of information represents a single transaction, a grab sample, describing the condition of road features as they were observed or measured on a given day, at a given time, through the perception of a person or crew. There is great value in having an ongoing record of these grab samples over time as they can describe changes and trends that are only apparent over time. It is only recent improvements in the performance of computers and decreases in the cost of information storage that allows us to work with the large number of pieces of information that come from condition surveys.

The dates when data was collected and the source of the data can be critically important elements used in the interpretation of the road condition field survey data. Data quality perceptions related to the source of data and the age of the observation are used in making interpretations and decisions.

Accumulation of condition survey information over time does provide potential opportunities for use of statistical analysis and trend analysis. Both of these analytical techniques depend on development of a history of observations that can be aggregated, separated, and compared. The patterns of a series of transactions over time is different than the patterns from traditional inventory data as traditional inventory data only describes the condition as most recently entered.

2. Key Principles for Road Condition Survey Data.

a. The history of data is valuable. The history of the sources of data, the conditions under which it is collected, the season of the year, all allow the identification of trends or variability in information.

b. The source of the information collected and who collected the information and entered it can affect interpretation and generalization of the information. The quality of the information as interpreted varied with the qualifications, training, experience, and situations for the collection of the information. Road log information collected a few years ago will be viewed differently than information gathered next summer.

c. Different people can get different information measuring the same thing at different times. The purpose of protocols is to keep the differences to acceptable limits of variation.

d. Partial information can be frustrating, but partial information is more useful than no information.

e. An approximation is better than no information; especially when there are qualifiers on the reliability or precision of the information. The notable example of this is the use of older road log information.
f. With spatially linked data, knowing a little information allows display and interpretation of a vast amount of related information.

g. Null data, a field with no data entered is interpreted as a data field with no data available. Fields where the data is not applicable should be coded as NA (not applicable) or with similar code to indicate that the element was considered.

h. Interpreting the information may require a combination of data elements. For example, stream locations where one of the variables for presence of fish show that fish have been found is a fish stream. Sites where anadromous species are shown to be present in the data elements will be interpreted as an anadromous fish stream. Streams where fish are found upstream and downstream require fish passage. Stream crossings where fish are found downstream and habitat but not fish occur upstream need to be checked carefully as there is an apparent blockage of fish passage.

i. Data elements may be entered before the road is constructed. For example, fish species identification made in advance of road construction (such as those made during environmental analysis processes) can be entered by coordinates.

j. Field data collection can be separated from analysis, calculation, development of alternatives, prescriptions, and other processes that use the field data. (See the separation of the protocol into sections).

3. <u>Differences in "World View."</u> Working with spatial data such a Geographic Information System (GIS) data is very different than working with tabular data. The differences are subtle in many cases. Working with shared data is a two-way path. As you provide information, information is also received.

Transaction data that is collected while on a visit to a site on a single occurrence is different from the data that is retained in inventories. Inventories represent a view of the most current information available and can be interpreted on the basis of several assumptions. One of the assumptions is that things represented by the inventory are substantially the same today when the data are viewed, as they were when the data was collected and stored. Another assumption is that the information is not expected to change in a meaningful way in the near term.

4. <u>Information Levels and Platforms</u>. Data can be considered as appropriate to the needs for which it is collected and maintained. Each organizational level can

identify the information needed to provide consistency in reporting and describing different features. The choices of where information resides needs to be conditioned by the nature of the data and uses. INFRA is an inventory structure and maintains only the most current entry or updated input. Road condition survey data design provides a historical view of road condition and actions over time.

a. National Data includes the data elements prescribed by national policy. National data represents the minimum data that will be kept in an inventory system and used for reporting nationally. The national data elements are identified in the Washington Office (WO) manuals and handbooks and will reside in the INFRA data inventory system, an Oracle database.

b. Regional Data includes additional data elements prescribed by regional policy. The data represent data that is found to be useful for addressing issues of a regional nature, and provide consistency between units within a region. Regional data may be stored either in INFRA or in INFO data sets associated with GIS. Examples of regional data include data elements described in regional guides, data elements needed for region-wide Memorandums of Understanding, such as, the Fish Passage SMOU (98MOU-10-011).

c. Forest Data includes additional data elements prescribed by the Forest Supervisor to meet the issues, concerns, and opportunities of the Forest. Forest data is especially needed for Forest Plan revision or implementation. Forest data may be stored in either INFRA data structures or in INFO data sets associated with the Forest GIS coverage.

Examples of forest data include additional information called for in Forest Supervisor executed Memorandums of Understanding, or that identified as needed for Forest Planning.

d. Project Data includes additional data elements needed for project specific works. Most commonly this will be additions to national, regional, and forest data required to address the issues, concerns, and opportunities associated with environmental analysis processes.

5. Data Quality. Data interpretation is affected by the qualifications of the people making observations and recording data. Observations of the presence of fish and the species present is not used the same if the data is collected by a person trained in landscape architecture as it is by a person trained in aquatic biology. The protocols included are intended to provide consistency in data acquisition.

Data will undergo examination for quality by data stewards responsible for the various coverages in GIS and the associated data elements. Data of various quality and sources can be used and aggregated as there are ways to identify the source and qualifications related to the data collection and storage. External parties will review data based on who made the observation and when they were made (see SMOU 98MOOU-10-011 Addendum 1 for examples).

6. Monitoring as a Part of Road Condition Surveys. Road condition surveys provide an excellent opportunity to monitor data already in GIS. By providing field level transaction information, the information contained on GIS layers can be tested, challenged, revised, and/or further sampled. In general, where there is a data element included in these protocols, they are to record field observations. The field observations are expected to be used to compare to existing information in GIS and to further refine the GIS data set. Care must be taken that large amounts of time are not spent reconfirming stable data. Statistical quality control processes can be used to determine the amount of effort most effective to field check and refine data.

7. Metric vs. Inch-pound Measurement. The Forest Service is implementing metric measurements for road construction. As yet not all features are ready for metric display. These protocols are based on continuing use of inch-pound measurement through FY 1999. It is expected that conversion of all the road conditions survey protocols and data to metric units of measure will occur during the winter of FY 2000

8. Model for Field Data Entry. Field Data entry for the road condition survey is intended to be partial. There is little rationale for filling all fields possible at all mile points possible. Basic information that describes the features can be accumulated iteratively through the process.

a. Example 1. Data collection along the road corridor begins at or precedes preliminary design 1 in a time sequence. Fish data is collected, at or near stream crossings. Established data standards during NEPA verification call for verification of species and identification of the collector and date. Site coordinate and road number can enter this information into the road condition survey data. Note that road numbers can be established early in the NEPA process and each unit is responsible for road number assignments.

Hydraulic structures are defined during the design process. During road construction/reconstruction the construction administration staff measures and collects data on the features built into the road. Culvert dimensions, grade, cover, length, etc. are commonly measure and can be entered. Cross section information, turnout information, and other descriptive information about the as-constructed features are entered with the year of construction. As the road is monitored, additional information will be gathered, as there are reasons to collect it.

b. Example 2. Road log data from existing records is available for a road. The road log data was collected with a precision odometer. Data includes mile points and diameter of all culverts, locations of signs, locations of intersections, turnouts, and other physical features.

This data can be utilized in the road condition survey data by entering the data into the format below. For CREW use the name "roadlog". If the date of the road log is available, use it, otherwise use a date appropriate to when the road log work was done. One way to key such data is to use January 1 as the month and day for data imported with indeterminate month and day information. For mass movement of road log data in other electronic formats, reformatting to match import format for spreadsheets can be done.

9. Coding Practices and Conventions. The protocols are extensive and complex. Field testing indicates that crews can be trained and can perform the work. Newly trained employees in a two person crew will accomplish about a mile of survey per workday. With this large an investment, making sure that the information represents field measurements and observations in a consistent manner is important. Some more senior staff have use the protocol to record prescriptions (just saw the things needing to be fixed), but failed to gather the measurements called for in the protocol. The results were an additional trip to get the measurements needed to define the work for contractors. Some of the field prescriptions did not survive the subsequent analysis process, and alternative solutions were implemented.

Culvert Blockage is an item that generated considerable discussion of how best to code information. The crews encounter partially plugged culverts during the survey work. They are trained to take action to fix the problem if it is within the scope of reasonable effort for hand labor. If a culvert which is 60 percent blocked is cleaned to 20 percent blocked, what is entered for culvert blockage? The convention to be used is to record the percent the culvert is blocked when they leave the site, and to record the work done with the percent blocked under Action Taken. The following examples show some possible data entry:

A TAK	% BLOCK
BDL60	20
BDL30	0
BVR100	50

This convention allows the initial and final results to be tracked. Later actions by a road maintenance crew with chainsaws might result in a coding of BVR50 and 0 for the last site.

There has been considerable effort made to define different classes of drainages within the Alaska Region. Definitions have moved as efforts to define lower order drainages consistently have been debated. See Element 29 for the current approach being used.

10. Multiple Line Entry. The normal data entry method is expected to be spreadsheet format. There will be occasions where the descriptors needed cannot fit onto a single row of a spreadsheet. Multiple entries in the form of multiple rows may be used. It is important that the road number, mile post, date, and crew fields be filled in for multiple line entries.

11. Data Collection and Processing. The following are consensus standards and processes for handling road condition survey data. Because data collection is done with partners such as the Alaska Department of Fish and Game, consistency across agencies requires conformance to data standards.

a. Field Data Entry Devices. The expected standard equipment for entry of RCS field information is an HP palmtop model 360 LX or newer. A regional technical approval was written and approved for the purchase of these units. The monochrome screen on the most battery efficient form, with two AA batteries lasting a full work day. The palmtop includes PocketExcel spreadsheet as firmware. A standard data entry template is provided to field crews with the elements in numeric order shown in Section 1. The HP palmtop has a serial connection built into a docking cradle and comes with software to move files to and from a full function personal computer (either laptop or desktop). Compact flash cards are also available for file storage.

b. File Formats. Consensus standards is for files to be saved for each road surveyed. Files are saved as Excel Workbooks.

c. Data Template. Data processing requirements call for the field data to be ordered in columns ordered as listed in the schedule below. While there is nothing to prevent field crews from changing the order of columns, it will introduce additional work and opportunity for errors. The data template is a single sheet Excel Workbook (Office 97 compatible).

d. Field Data Quality Assurance Processes. Field data is reviewed by the crew for errors and omissions at the end of each day. Field crews will download files. The files are transferred to assistant data stewards weekly. The assistant data stewards are responsible for examining the data for consistency and moving it to a desktop personal computer for processing. Notes field is screened for information that indicates immediate action is needed (immediate threat to health, safety, resources, etc.). Assistant data stewards will also work with field crews to resolve questions about coding conventions, select samples of data to examine for consistency, and review field operations to assure protocol compliance.

e. Data Steward Role. The data stewards for road condition survey information are the same people who have the role and responsibility for quality and consistency for the roads layer in GIS. Data Stewards for FY 1999 include Ken Vaughan (Regional role), Bob Demmert, Rob Aiken, Sam Grimes, and Rich Jacobson. Jim Cariello takes a similar role for the Alaska Department of Fish and Game for road condition survey information. Data stewards will maintain the "corporate" road condition data set for the GIS coverages they are responsible for, and are points of contact for questions about available data and content. Road condition survey data will be updated quarterly by the data stewards after assurance that data standards have been met. CD-ROM formats are the preferred method of sharing road condition survey information.

f. Assistant Data Steward Role. Assistant data stewards work with field crews, gather the data from field crews and prepare the data, process it, and pass it to the data steward for inclusion with the road condition data set. Data is considered as draft or in progress work until passed to the data steward. Jim Cariello also takes an assistant data steward role for the Alaska Department of Fish and Game. Some assistant data stewards for FY 1999 are Dennis Vogan, Glen Cross, John McDonell, Brian Crider, Sam Grimes.

g. Data Migration Process. Road condition survey data starts with an excel spreadsheet and ends with a DBF file. The file format for the ending is one that provides a high level of universality while being directly accessible to ArcView queries on either PC ArcView or IBM server versions. Data migration paths used to date are to:

1. Move the Excel Workbook file from the palmtop to a laptop or desk top computer.

2. After completing data review, transfer the file to an assistant data steward.

3. Open the file in Excel and run the processing Macro (renames sheet 2, copies road number and mile point from sheet 1, formats it with formulas, calculates values, sets column width necessary for matching other formats).

4. *Select All* on sheet 1 and *Save As* selecting the dBase IV file format and using the road number in the file name (Road#.DBF).

5. *Select All* on sheet 2 and *Save As* selecting the dBase IV file format and using the road number in the file format (Road#_CAL.DBF).

6. Using a dBase IV compatible data base program, load the file produced in step 5, and delete all records where there is not other data then the road number and milepost.

7. Transfer the completed files to the data steward.

ROAD CONDITION SURVEY DATA ELEMENTS

SECTION I - Field Collected Data Standards

Information

No.	Element	Abbreviation	Survey
1	Road Number	RTE_NO	Survey
2	Milepost	MP	Survey
3	Road System	SYS	GIS
4	Sampling Crew	CREW	Survey
5	Date	DATE	Survey
6	Feature	FEAT	Survey
7	Descriptive Parameter	PRM	Survey
8	Access and Travel Management	ATM	Survey
9	Sign Condition	SGN_C	Survey
10	Problem Mechanism	FAIL	Survey
11	Photograph	PIC	Survey
12	Height of feature	HGT	Survey
13	Width of feature	WID	Survey
14	Length of feature	LEN	Survey
15	Entrance Type	ENT	Survey
16	Ditch Block	DB	Survey
17	Catch Basin	CB	Survey
18	Inlet Erosion	IE	Survey
19	Outlet Erosion	OE	Survey
20	% Block	BLK	Survey
21	% Structure Damage	SD	Survey
22	Skew Angle	SKEW	Survey
23	Road Grade	RD_G	Survey
24	Spare	Spare	
25	Bedwidth Upstream of Inlet	B_US	Survey
26	Upstream Gradient	U_GD	Survey
27	Downstream Gradient	D_GD	Survey
28	Channel Type	CHT	Survey
29	Verified Streams Class	AHMU	Survey
30	Fish Habitat	HAB	Survey
31	Spare	Spare	
32	Fish Sampling Method	SMP	Survey
33	Silver Salmon Presence	SS	Survey
34	Cutthroat Presence	CT	Survey
35	Dolly Varden Presence	DV	Survey
36	Steelhead Presence	SH	Survey
37	Chum Salmon Presence	CS	Survey

38	King Salmon Presence	KS	Survey

No.	Element	Abbreviation	Survey
39	Pink Salmon Presence	PS	Survey
40	Sockeye Salmon Presence	RS	Survey
41	Sculpin Presence	SC	Survey
42	Stickleback Presence	SB	Survey
43	Spare	Spare	
44	Height of Instrument	HI	Survey
45	RR Top of Culvert at Inlet	TC_I	Survey
46	Culvert Opening at Inlet	CO_I	Survey
47	Culvert Bedload Coverage	BLD_C	Survey
48	Culvert Bedload Type	BLD_T	Survey
49	Upstream Substrate Type	U_SB	Survey
50	RR Top of Culvert at Outlet	TC_O	Survey
51	Culvert Opening at Outlet	CO_O	Survey
52	Pool Depth 6" Downstream of Outlet	PD	Survey
53	RR Water Surface Elevation	WSE	Survey
54	RR Tailcrest	TC	Survey
55	RR Ordinary High Water Mark at Outlet	OHW_O	Survey
56	Bed Width at Tailcrest	B_TC	Survey
57	RR Ordinary High Water Width at Tailcrest	OHW_W	Survey
58	Spare	Spare	
59	Special Site Condition	SSC	Survey
60	Action Taken	A_TAK	Survey[1]
61	Action Required	A_REQ	Survey
62	Priority	PRI	Survey
63	Problem Corrected	COR	Survey
64	Notes	NOTES	Survey

[1] It is anticipated that field crews doing road maintenance work will be using the protocol and this field to record work tasks accomplished.

SECTION II - Analysis Parameters
do not publish Sections II and III since they are not correct Information

No.	Element	Abbreviation	Survey
1	Road Number	RTE_NO	Survey
2	Milepost	MP	Survey
3	Year Constructed	YRCON	Office
4	Year Road Closed	YRCLO	Office

5	Value Comparison Unit	VCU	GIS
6	Watershed Minor No.	WATSHD	GIS
7	Hill Slope Position	HILL_P	Office
8	Area	AREA	Generated
9	Culvert Cover at Inlet	I_EL	Generated
10	Culvert Cover at Outlet	O_EL	Generated
11	Percent Ordinary High Water	H20_STG	Generated
12	2 Year, 2 Day Delay	VELOCITY	Generated
13	Perch Height at Inlet	PRCH_IN	Generated
14	Perch Height at Outlet - Flow Independent	PRCH_O_I	Generated
15	Perch Height at Outlet - Flow Dependent	PRCH_O_D	Generated
16	Bedload Depth at Inlet	BDLD_I	Generated
17	Bedload Depth at Outlet	BDLD_O	Generated
18	Outlet Pool Tailcrest Depth	OP_TC	Generated
19	Culvert Gradient	CUL_G	Generated
20	Sign Type	SGN_TYP	Office

SECTION III - Associated Survey Parameters

Information

No.	Element	Abbreviation	Survey
1	Road Number	RTE_NO	Survey
2	Milepost	MP	Survey
3	Fish Habitat Suitability	HABS	Field
4	Up Stream Habitat Reach	HABL	Field

ROAD CONDITION SURVEY ELEMENT DEFINITIONS

SECTION I - Minimum Field Data Standards

Element 1: RTE_NO (ROAD#)	**Rev. 5/99**
Road Number	**National Data Element (FSH)**

1. Instructions

Obtain forest road number from GIS plot. Enter numeric value into palmtop. Specified forest roads have 2 to 7 digits.

Note: Numbering Non-System Roads -- Use an alphabetic character in the road number for non-system (unclassified) road that are surveyed. The following example is the process developed in Ketchikan and uses the Ketchikan (R-6) road numbering schema.

The designation for non-system roads will consist of the parent Specified road number with the addition of the mile post (to the nearest 0.01 miles) and an orientating direction code (R for right, L for left, ST for straight ahead) attached to the end of FDR number. For example, a non-system road intersecting FDR 3030000 on the right at mile post 2.25 would have the designation 3030000_2.25R. Additional roads encountered off this non-system road will be designated by the addition of a progressive letter code at the end of the existing non-system road designator. For example, the first road off of 3030000_2.25R would be 3030000_2.25RA with the next being 3030000_2.25RB. The mileposts and direction of these alpha designated roads are recorded in the RCS for 3030000_2.25R. The road number of those alpha designated non-system road should be recorded in the remarks column where the parameter spur right or left (RS/LS/ST) is recorded.

2. Valid Values (codes)

System Roads to 7 digits, numeric. Non-System Roads not to exceed 20 digits, alphanumeric.

Element 2: MP	**Rev. 5/99**
Milepost	**Regional Data Element**

1. Instructions

A value which identifies the location of a feature along the road. The value is cumulative for each road and begins at its origin. Each road origin is 0.000 MP. When a precision odometer such as the DM Surveyor is used all features of interest are measured by aligning the drivers eye with the feature. Culverts that are not perpendicular to the road prism are measured at their location in the center of the road prism. If an alternative measuring device (e.g. hip chain) is required (undriveable road) measure to at least the same precision (0.000 miles, 5.28 ft.) Record the milepost in 0.000 mile units only. The beginning of a road is considered the edge of the adjoining road prism. If there is not an adjoining road then it begins at the road # sign.

It is recommended to mark the mile post inside on the downstream end of each culvert with the paint pen. Mark mileposts on bridges preferably on the middle of the structure on the downstream side. Recommended colors are a blue paint pen to mark structures in streams were fish have been verified, a green paint pen on structures in streams believed to be fish habitat, and a red paint pen on all other structures.

2. Valid Values (codes)

00.000 through 999.999

3. Units

Miles

4. Accuracy/Precision

~+/-0.002 miles/mile, 0.000 mile

Element 3: SYS	**Forest Data Field**	**Rev. 5/99**
Road System	**Defined for Each Ranger District**	

1. Instructions

Enter road system code. A road system is defined as a series of interconnected roads. Each unit has defined a set of codes that are convenient as a local data set. Local data stewards have the defined codes. Those listed below are for the Petersburg and Wrangell Ranger Districts.

2. Valid Values (codes)

Code	Description
TB	Thomas Bay
MT	Mitkof
TK	Tonka
PB	Portage Bay
RB	Rowan Bay
KK	Kake

WG Wrangell

2. **Valid Values (codes)** (continued)

ZA Zarembo
ET Etolin
FR Frosty
RY Rynda

Element 4: CREW	**Rev. 5/99**
Sampling Crew	**Regional Data Field (locally defined)**

1. **Instructions**

Enter first initial and last name for both the lead engineering and fisheries specialists collecting data. Individual names should be no longer than 8 characters total length and correspond to their e-mail user ID. List the engineering specialist first and separate the two with an underscore between the individual names. Examples of typical data entries are:

dbosell_slevesqu dvogan_gcross

Element 5: DATE	**Rev. 5/99**
Date	**Regional Data Field**

1. **Instructions**

Enter the date in the format shown below. Note that dates are important and approximate dates are better than no date.

2. **Valid Values (codes)**

(six digit numeric display)

3. **Units**

Not applicable

4. **Accuracy/Precision**

No errors, approximations are acceptable

5. **Example**

060396 **Note** that while spreadsheets do store dates internally as a unique day number with many different display formats, exported data needs to be formatted for date calculations with 4 digits for the year.

Element 6: FEAT	**Rev. 5/99**
Feature Type	**Regional Data Field**

1. Instructions

All data entries must contain a Feature value and other data elements in the spreadsheet row must relate to it. If more than one drainage structure Feature is associated with the same stream, attach a numeric postscript to the Feature Code (i.e., each culvert in a double installation of corrugated metal pipes would be entered with a unique milepost and a Feature Code of "CP2"). If Feature Code "MI" is used to record a prescription, also record a separate entry which includes the necessary codes to describe the physical problem the prescription is meant to remedy.

2. Valid Values (codes)

Code	Definition
CP	Corrugated metal pipe
CPB	Corrugated metal pipe with baffles
PA	Corrugated metal pipe arch (squash pipe)
PAB	Corrugated metal pipe arch (squash pipe) with baffles
CO	Corrugated metal arch - open bottom
PP	Corrugated plastic pipe
AR	Structural plate pipe arch - (closed bottom, multi-plate)
AO	Structural plate arch - (open bottom, multi-plate)
PB	Long term permanent bridge
MB	Modular bridge
LB	Log stringer bridge
LC	Log culvert
WC	Wooden culvert
RM	Removed structure
MI	Site where structure is needed in future
AB	Abutments are present, though the bridge is not
WB	Water bar or similar device to divert water off the road
TO	Turnout
JH	J-hole, also called a turnaround
SI	Sign
BC	Blocking or closure device
SY	Sort yard
QY	Quarry
XS	X-section
SM	Surface material

LT	Log transfer Facility
DF	Dock and float
FD	Ford

2. Valid Values (codes) (continued)

RP	Ramp
IS	Intersection
LD	Landing
GR	Guardrail
OT	Other (specify in notes)

Element 7: PRM **Rev. 5/99**
Descriptive Parameter **Regional Data Field**

1. Instructions

Enter the parameter associated with the feature (FEAT) that is being described. The PRM field provides additional information about a feature or situation associated with a feature.

2. Valid Values (codes)

Code	Definition
DR	Ditch relief or Cross Drain
NS	TLMP non-stream
SC	Stream crossing
CE	Cut-slope erosion location
FE	Fill slope erosion location
QE	Quarry Erosion
SE	Surface erosion location
SL	Landslide (from above the road)
WR	Water running across, or standing on, a surface (road, quarry, etc.)
SF	Stress fracture parallel to roadway
HO	Hole in road surface
CH	Chuck holes are predominate at this section
WD	Washboard predominates at this section
RT	Road rutting predominates at this section
AC	Alligator cracking in the pavement (fill in length and width fields)
RH	Rough
RD	Rolling dip is present at this section
BR	Berm on Road
DV	Ditch stable and functioning well (vegetated)
DE	Ditch erosion location
DP	Ditch plugging evident
BB	Brush encroachment (slapping vehicle) begins

BE	Brush encroachment (slapping vehicle) ends
CL	Clearing brush or blowdown
DS	Bridge Deck run-off sediment
SA	Stream abutment erosion
EC	Stream encroachment
LS	Spur road located to the left
RS	Spur road located to the right
ST	Spur straight ahead
DW	Driveway
(2-7 digits)	Intersecting specified road (enter road number in parameter field)
ER	End of Road
(Signs)	Record message on all vertical signs (mp9, 3030000, etc.)
PR	Pit-run shot rock surface predominates at this section
SR	Select aggregate surfacing predominates at this section
PV	Paving of roadway
RWL	Retaining wall left
RWR	Retaining wall right
NO	None listed above
OT	Other (specify in notes)

Element 8: ATM (CLOD)	**Rev. 5/99**
Access and Travel Management	**Regional Data Field**

1. Instructions

This field is intended to be used with a Feature (FEAT) entry indicating an access or travel management object or device. Describe the feature that blocks, closes or influences travel on the road. Road log databases are a convenient source of historical information. Multiple lines may be used.

2. Valid Values (codes)

Code	Definition
N	Traffic not restricted
GTC	Gated and gate closed
GTO	Gated and gate open
TT	Mound/Pit blocking car and truck traffic
TTD	Mound/Pit and evidence of use by car or truck traffic
VEG	Organic closure
PB	Pulled bridge
PBD	Pulled bridge and evidence of use by car or truck traffic
PC	Pulled culvert
PCD	Pulled culvert and evidence of use by car or truck traffic
SLD	Slide blocking the road to some or all traffic
WO	Wash out

BD	Blowdown timber
COMV	Closure order posted for motorized vehicles
COSE	Closure order posted for seasonal use
COWT	Closure order posted allowing winter vehicle use
TRIB	Tributary to a road closed by another device. Place road number and milepost of closure (if known) of closed road by another device in remarks column. If tributary road is closed by it's own device, add an additional line item for it.
TRAV	Roadway impassable by non-listed criteria, this includes obliterated (eg., rock pulled) stored, decommissioned, and roads closed according to FPA, etc.

Element 9: SGN_CON **Rev. 5/99**
Sign condition **Regional Data Field**

1. Instructions

Record the condition of forest road signs. If the sign is a vertical route marker or milepost marker, also record the sign message (eg. 3030000 or mp9) in the Parameter column (Element 7). For all other signs, a photograph is required to record sign message and type and must be recorded in the Photograph column (Element 11). Record type of sign in notes (eg. Warning, directional, information, regulatory).

2. Valid Values (codes)

Code	Definition
I	Intact and undamaged
D	Damaged but serviceable. Replacement not required. Specify damage in notes.
R	Replacement of sign is required. Specify reason for replacement in notes.
N	Sign needed. Recommend placement of sign at this milepost. Specify type of sign in notes.

Element 10: FAIL **Rev. 5/99**
Problem mechanism **Regional Data Field**

1. Instructions

Record the dominant mechanism which caused (is causing) the improper function of this feature. The failure should be associated with the feature (FEAT) identified at this site. Attempt to determine the primary or initial mechanism by which the problem occurred.

2. Valid Values (codes)

Code	Definition
N	No Failure
WDC	Woody debris in culvert
WDD	Woody debris in ditch
RF	Road Fill (pushed off road by grader)
RG	Road grade needs crowning/shaping
SDC	Sediment accumulation in culvert
SDD	Sediment accumulation in ditch
FS	Fill slump or slide
MDB	Missing or inadequate ditch (blasting required to create ditch)
MDD	Missing or inadequate ditch (diggable material)
CSC	Cut-slope slumping or sliding into culvert (single event)
CSD	Cut-slope slumping or sliding into ditch (single event)
EC	Hydraulic flows exceeded capacity
DF	Debris flow
MP	Mechanical damage or joints parting
CP	Piping of water through the fill (along pipe, through voids, etc.)
KT	Karst topography is cause of failure
BV	Beaver activity
OS	Oversteepened slopes
MT	Material inadequate for designed use (sand in ¾:1 cutbank, 6" minus fill material at culvert outlet, etc.).
CS	Culvert is too short
AL	Culvert is poorly aligned
IB	Improper installation
SS	Subsidence
SC	Side Cast Material cracking off roadway
LD	Lip distortion at inlets
SD	Stream in ditch
WX	Weathering or corrosion
VN	Vandalism
BD	Blocked Ditch (obsolete code, use more specific codes above)
OT	Other (specify in notes)

More than one classification is permitted with separation by an underscore.

Element 11: **PIC (PHOTO)**	**Rev. 5/99**
Photograph	**Field Crew and Office Alert Flag**

1. Instructions

Record if a photograph or digital still was taken of feature. Photos may be hot-linked in ARCVIEW for features. The following photographs are required: all fish, mounted signs, all features identified as Critical and Emergency priorities (Element 62), Special Site Conditions that affect fish, view of Tailcrest cross section (see Element 54) looking upstream to the culvert outlet; and all signs other than vertical route and milepost markers.

2. Valid Values (codes)

Code	Description
Y	Photograph taken
N	Photograph not taken

Element 12: **HIGH**	**Rev. 5/99**
Height of depth of feature	**Regional Data Field**

1. Instructions

This measurement is used to measure height, or depth dependent upon the feature (FEAT) being measured. For culverts this is the vertical distance from bottom to top (measure with rod or steel tape (used in conjunction with (Width). For culverts with significant bedload, enter 999 to code it as immeasurable. Waterbars are measured from bottom of waterbar to roadway elevation at road centerline, signs are measured from top to ground. Use this field to record the depth of significant surface erosion so that volumes may be calculated (in conjunction with width and length).

2. Valid Values (codes)
12 through 999

3. Units

Inches for culverts
Feet otherwise

4. Accuracy/Precision

Culverts 1 inch, Erosion 0.1 feet

Element 13: **WIDTH**	**Rev. 5/99**
Width	**Regional Data Field**

1. Instructions

The horizontal dimension of features (FEAT) such as culverts and erosion. For erosion this is the dimension that is perpendicular to the roadway.

2. Valid Values (codes)

1 through 999

3. Units

Inches for culverts
Feet for erosion

4. Accuracy/Precision

Culverts 1-inch
Erosion 1-foot

Element 14: **LENG**	**Rev. 5/99**
Length of Feature	**Regional Data Field**

1. Instructions

Record the length of the feature. For erosion, length is the dimension that is parallel to the roadway use in conjunction with WIDTH to obtain area and in conjunction with the element HIGH to obtain volume if desired. For beveled and mitered pipes, measure the length on top of the pipe. Put additive length of bevels in notes (eg. For 8' upstream bevel and 12' downstream bevel, record "20' bevel length" in notes). This element is also used to record culvert length.

The culvert length measurement is the slope distance from the inlet of the culvert to the outlet of the culvert. Record the measurement to the (even feet) nearest foot. See the "Typical Stream Profile" drawing.

2. Valid Values (codes)

1 to 100,000

3. Units

Feet

4. Accuracy/Precision

+/-1'

Element 15: EN_T	**Rev. 5/99**
Entrance Type	**Regional Data Field**

1. Instructions

Record the appropriate entrance type.

2. Valid Values (codes)

Code	Description
PRO	Projecting
STB	Step beveled
MIT	Mitered (includes compound beveled, etc.)
FLU	Flush in headwall
FLA	Flared Inlet

Element 16: DB	**Rev. 5/99**
Ditch Block	**Regional Data Field**

1. Instructions

Determine if ditch block is required and needs building. Most cross drains require a catch basin with associated ditch block.

2. Valid Values (codes)

Code	Definition
N	No ditch block and none needed
I	Ditch block intact and functioning
B	Building of ditch block required
M	Maintenance of ditch block required

Element 17: CB	**Rev. 5/99**
Catch Basin	**Regional Data Field**

1. Instructions

Determine if catch basin requires cleaning or building. Most cross drains require a catch basin with associated ditch block.

2. Valid Values (codes)

Code	Definition
N	No Catch basin and none needed
I	Catch basin intact and functioning
B	Building or rebuilding of a catch basin required
M	Cleaning of catch basin required

Element 18: IE	**Rev. 5/99**
Inlet Erosion	**Regional Data Field**

1. Instructions

Determine if inlet erosion is present and the action required to alleviate erosion. Use notes to clarify the situation as necessary.

2. Valid Values (codes)

Code	Definition
N	No inlet erosion
F	Fill Slope erosion protection needed (rip rap or other)
I	Inlet conditions improvement needed (flare inlet, etc..)
B	Bank protection needed at upstream banks (rip rap or other)
O	Other (specify in notes)

More than one classification is permitted with separation by an underscore.

Element 19: OE	**Rev. 5/99**
Outlet Erosion	**Regional Data Field**

1. Instructions

Determine if outlet erosion is present and action required to alleviate erosion. Use notes to clarify and expound if necessary.

2. Valid Values (codes)

Code	Definition
N	No outlet erosion
F	Fill slope protection needed (rip rap or other)
D	Energy dissipater or outlet pool needed
B	Bank protection needed at downstream banks (rip rap or other)
O	Other (specify in notes)

More than one classification is permitted with separation by an underscore.

Element 20: BLK (%_BLK)	**Rev. 5/99**
% Block	**Regional Data Field**

1. Instructions

Determine the amount (percent of culvert area) of blockage within, or immediately at the inlet or outlet of the culvert. Culverts are often designed to accumulate bedload to facilitate fish passage, this bedload deposition (if less than 30% of area) should not be considered a blockage. Bedload depths will be recorded on verified fish stream conditions as you observe at time viewed under CO_I and CO_O.

2. Valid Values (codes)

0 through 100

3. Unit

Percent

4. Accuracy/Precision

+/- 5 percent

Element 21: SD (%_SD)	**Rev. 5/99**
Structure Damage	**Regional Data Field**

1. Instructions

This field is used to identify if there is damage to the hydrologic structure or device (culvert, etc.) being inspected. Estimate the total percent cross sectional area of the damage if the barrel is dented or crushed to reduce cross section area. Record decrease in original inlet area. This applies to structural damage at the inlet, outlet, or interior sections of the pipe. Enter a 999 code if there is other structural damage such as a joint separation.

2. Valid Values (codes)

5 through 100, or 999 if other structural damage such a joint damage.

3. Units

Percent

4. Accuracy/Precision

+/- 5%

Element 22: SKEW	**Rev. 5/99**
Skew Angle	**Regional Data Field**

1. Instructions

Use compass azimuths of the road and culvert to calculate the downslope angle from perpendicular where the culvert crosses the road prism. A culvert installed perpendicular to the road prism has 0 degrees skew angle.

2. Valid Values (codes)

0 to 75

3. Units

Degrees

4. Accuracy/Precision

+/- 5 degrees

Element 23: RD_G	**Rev. 5/99**
Road Grade	**Regional Data Field**

1. Instructions

Record the percent slope on the steepest side of the road for the X-section Feature (FEAT). Take the average grade for crests and sags. Use downslope grade where erosion potential is present. Road grade measurement convention is to measure the grade over a 100-foot section. Grade is taken from a point 50' before the Feature to 50' past the feature (the 50 foot rule). Generally road grade will be most important at steep sections or in highly erosive materials.

2. Valid Values (codes)

0 to 25

3. Units

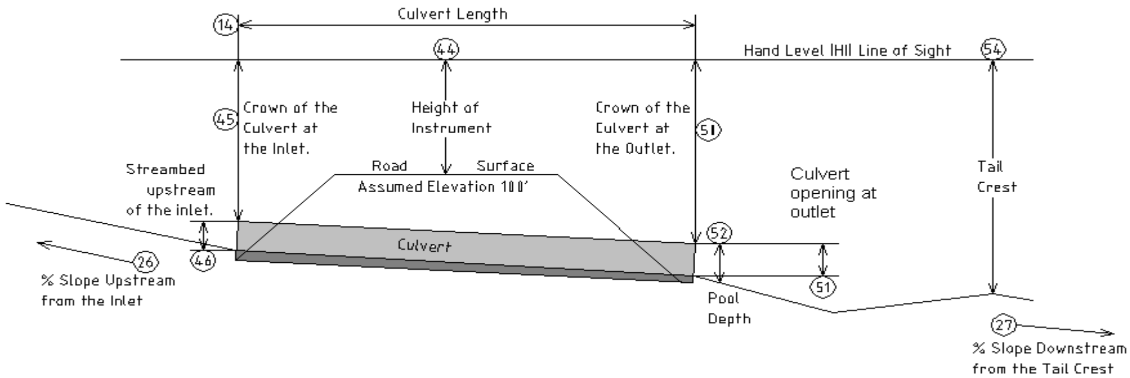
Percent

4. Accuracy/Precision

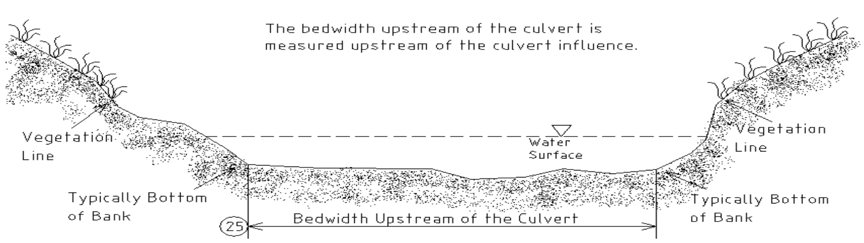
+/- 2%

Element 24: Spare (blank field in data entry spreadsheet)	**Rev. 5/99**

Stream Crossing Measurements -- Elements 25-30 are applicable to all stream crossings



Typical Stream Profile
and Road Cross-Section



Typical Upstream Cross-Section

Element 25: B_US	**Rev. 5/99**
Bedwidth Upstream of Inlet	**Regional Data Field**

1. Instructions

The Bedwidth Upstream of the Inlet measurement is the horizontal distance from the bottom-of-bank to the bottom-of-bank measured at an average representative cross section far enough upstream to be out of the area of influence of the culvert inlet. The location will vary depending on the characteristics of the stream channel. If two channels merge at an inlet, substitute downstream width, or combine the two upstream channels. Note what was recorded in the notes. Record the measurement to the nearest 0.1 feet. See the "Typical Upstream Cross-Section" drawing.

2. Valid Values (codes)

0.1 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot

Element 26: U_GD	**Rev. 5/99**
Upstream Gradient	**Regional Data Field**

1. Instructions

The grade is the natural gradient of the stream outside of culvert or construction influence. The Upstream gradient of the stream is measured in percent(%) from the inlet. Record the measurement to the nearest 0.5%. See the "Typical Stream Profile" drawing. Grades are commonly measured with a clinometer. If gradient is greater than 30%, record measurement to the nearest 5%.

2. Valid Values (codes)

0.0 through 200

3. Units

Percent gradient

4. Accuracy/Precision

+/- 1%/ 0.5%

Element 27: D_GD	**Rev. 5/99**
Downstream Gradient	**Regional Data Field**

1. Instructions

The downstream gradient of the stream measured in percent(%) from the tailcrest. If a defined tailcrest is not located, take the measurement approximately 3 times the culvert outlet opening downstream. See the "Typical Stream Profile" drawing. Record the measurement to the nearest 0.5%. Grades are normally measured with a clinometer. If gradient is greater than 30%, record measurement to the nearest 5%.

2. Valid Values (codes)

0.0 through 200

3. Units

Percent gradient

4. Accuracy/Precision

+/- 0.5%

Element 28: CT	**Rev. 5/99**
Channel Type	**Regional Data Field**

1. Instructions

Record Stream Process Group for the channel upstream of the road crossing. Use the Channel Type Users Guide for reference. Identify only streams greater than 1 meter width. Identification to the Channel Type level is optional.

2. Valid Values (codes)

Code	Definition
ES	Esturine Process Group
PA	Palustrine Process Group
FP	Flood Plain Process Group
GO	Glacial Outwash Process Group
AF	Alluvial Fan Process Group

LC	Large Contained Process Group
MM	Moderate Mixed Control Process Group
MC	Moderate Gradient Contained Process Group
HC	High Gradient Contained Process Group
N	Not typeable by field crew

Element 29: AHMU	**Rev. 5/99**
Verified Stream Class	**Regional Data Field**

1. Instructions

Record AHMU stream class observed. Road condition survey work is to provide more intensive information for streams with fish, ie. Code 1 and Code 2 drainages.

2. Valid Values (codes)

Code	Definition
1	Stream Class I
2	Stream Class II
3	Stream Class III
4	Stream IV
5	TLMP non-stream (Waterway)
N	Not classified

Element 30: HAB	**Rev. 5/99**
Fish Habitat	**Regional Data Field**

1. Instructions

Determine if there is fish habitat immediately downstream or immediately upstream or both upstream and downstream of the structure. The standard for minimum habitat reach is 100 feet of stream reach. Stream reaches with gradients greater than 25% will normally not be considered fish habitat. In streams with gradients less than 25% consider the width of the stream, quantity and quality of pools, stream stability, number and height of natural barriers, and the proximity to known fish habitat. While the presence of fish is considered a positive proof of use of fish habitat, the absence of fish can not be taken as the opposite.

2. Valid Values (codes)

Code	Definition
U	Upstream
D	Downstream
B	Both upstream and downstream

N	No habitat present

Element 31: Spare (blank field in data entry spreadsheet) **Rev. 5/99**

Streams which are fish bearing or potentially fish bearing -- If the code for Element 30 is U, D, or B, collection of the following information is appropriate.

Element 32: SMP **Rev. 5/99**
Fish Sampling Method **Regional Data Field**

1. Instructions

Sampling method refers to the method used to verify fish presence. Sample all streams identified as having fish habitat both up and downstream. Use electroshocker as primary means of sampling. Electroshock downstream the greater of either 5 pools or 100 feet. Electroshock upstream the greater of either 5 pools or 100 feet. Use minnow traps where electroshocking is not efficient (palustrine channels) soak minnow traps a minimum of 30 minutes. Sample only during periods when flow allows efficient sampling (low to moderate flows). Generally, sample from May 15 to September 30. Release all fish unharmed to location captured.

2. Valid Values (codes)

Code	Definition
ES	Electroshocker used to verify fish presence
MT	Minnow trap used to verify fish presence
VS	Vision used to verify fish presence
DN	Dip net or other net
OT	Verified from other sources (define in notes)

Element 33: SS **Rev. 5/99**
Silver Salmon Presence **Regional Data Field**

1. Instructions

Electroshock stream to verify. Use minnow traps where electroshocking is not efficient (palustrine channels). Dip nets can also be used. Sample only during periods when flow allows efficient sampling (low to moderate flows). If adults are present record in notes.

2. Valid Values (codes)

Code	Definition
N	Coho presence not verified
U	Coho presence verified upstream of culvert
D	Coho presence verified downstream of culvert
B	Coho presence verified both downstream and upstream of culvert

Element 34: CT	**Rev. 5/99**
Cutthroat Presence	**Regional Data Field**

1. Instructions

Electroshock stream to verify. Use minnow traps where electroshocking is not efficient (palustrine channels). Dip nets may be used. Sample only during periods when flow allows efficient sampling (low to moderate flows).

2. Valid Values (codes)

Code	Definition
N	Cutthroat presence not verified
U	Cutthroat presence verified upstream of culvert
D	Cutthroat presence verified downstream of culvert
B	Cutthroat presence verified both downstream and upstream of culvert

Element 35: DV	**Rev. 5/99**
Dolly Varden Presence	**Regional Data Field**

1. Instructions

Electroshock stream to verify presence of Dolly Varden. Use minnow traps where electroshocking is not efficient (palustrine channels). Dip nets may be used. Sample only during periods when flow allows efficient sampling (low to moderate flows).

2. Valid Values (codes)

Code	Definition
N	Dolly Varden presence not verified
U	Dolly Varden presence verified upstream of culvert
D	Dolly Varden presence verified downstream of culvert
B	Dolly Varden presence verified both downstream and upstream of culvert

Element 36: SH	**Rev. 5/99**
Steelhead Presence	**Regional Data Field**

1. Instructions

Electroshock discouraged on steelhead streams. Trap or net stream to verify presence of steelhead. Sample only during periods when flow allows efficient sampling (low to moderate flows). If adults are present, record in notes.

2. Valid Values (codes)

Code	Definition
N	Steelhead presence not verified
U	Steelhead presence verified upstream of culvert
D	Steelhead presence verified downstream of culvert
B	Steelhead presence verified both downstream and upstream of culvert

Element 37: CS	**Rev. 5/99**
Chum Salmon Presence	**Regional Data Field**

1. Instructions

Note the presence of adult chum salmon. Record presence as either upstream, downstream or both.

2. Valid Values (codes)

Code	Definition
N	Chum presence not verified
U	Chum presence verified upstream of culvert
D	Chum presence verified downstream of culvert
B	Chum presence verified both downstream and upstream of culvert

Element 38: KS	**Rev. 5/99**
King Salmon Presence	**Regional Data Field**

1. Instructions

If king presence cannot be verified by ocular sampling, dip netting, etc. then electroshock stream to verify. Use minnow traps where electroshocking is not efficient (palustrine channels). Sample only during periods when flow allows efficient sampling (low to moderate flows). If adults are present record in notes. Record presence as either upstream, downstream, or both.

2. Valid Values (codes)

Code	Definition
N	King presence not verified
U	King presence verified upstream of culvert
D	King presence verified downstream of culvert
B	King presence verified both downstream and upstream of culvert

Element 39: PS	**Rev. 5/99**
Pink Salmon Presence	**Regional Data Field**

1. Instructions

Note the presence of adult pink salmon. Record presence as either upstream, downstream, or both.

2. Valid Values

Code	Definition
N	Pink presence not verified
U	Pink presence verified upstream of culvert
D	Pink presence verified downstream of culvert
B	Pink presence verified both downstream and upstream of culvert

Element 40: RS	**Rev. 5/99**
Sockeye Salmon Presence	**Regional Data Field**

1. Instructions

If sockeye presence cannot be verified by ocular sampling or dip netting, then electroshock stream to verify. Use minnow traps where electroshocking is not efficient (palustrine channels). Sample only during periods when flow allows efficient sampling (low to moderate flows). Also not presence of adult sockeye. Record presence as either upstream, downstream, or both.

2. Valid Values (codes)

Code	Definition
N	Sockeye presence not verified
U	Sockeye presence verified upstream of culvert
D	Sockeye presence verified downstream of culvert
B	Sockeye presence verified both downstream and upstream of culvert

Element 41: SC	**Rev. 5/99**
Sculpin Presence	**Regional Data Field**

1. Instructions

Electroshock stream or dip net to verify. Use minnow traps where electroshocking is not efficient (palustrine channels). Sample only during periods when flow allows efficient sampling (low to moderate flows).

2. Valid Values (codes)

Code	Definition
N	Sculpin presence not verified
U	Sculpin presence verified upstream of culvert
D	Sculpin presence verified downstream of culvert
B	Sculpin presence verified both downstream and upstream of culvert

Element 42: SB	**Rev. 5/99**
Stickleback Presence	**Regional Data Field**

1. Instructions

Electroshock stream or dip net to verify. Use minnow traps where electroshocking is not efficient (palustrine channels). Stickleback are most likely to be found in palustrine like channels. Sample only during periods when flow allows efficient sampling (low to moderate flows).

2. Valid Values (codes)

Code	Definition
N	Stickleback presence not verified
U	Stickleback presence verified upstream of culvert
D	Stickleback presence verified downstream of culvert
B	Stickleback presence verified both downstream and upstream of culvert

Element 43: Spare (blank field in data entry spreadsheet)	**Rev. 5/99**

Fish Stream Cross Section Information -- Information especially needed for all fish stream crossings.

Element 44: HI **Rev. 5/99**
Height of Instrument **Regional Data Field**

1. Instructions

Height of Instrument (HI) is the vertical distance between the level line of sight and the roadway established by a hand level on a staff at the centerline of the road. The length of the staff will be the recorded measurement. It is recommended that the hand level used be equipped with 2x magnification on the bubble and 5x on the sighting window.

2. Valid Values (codes)

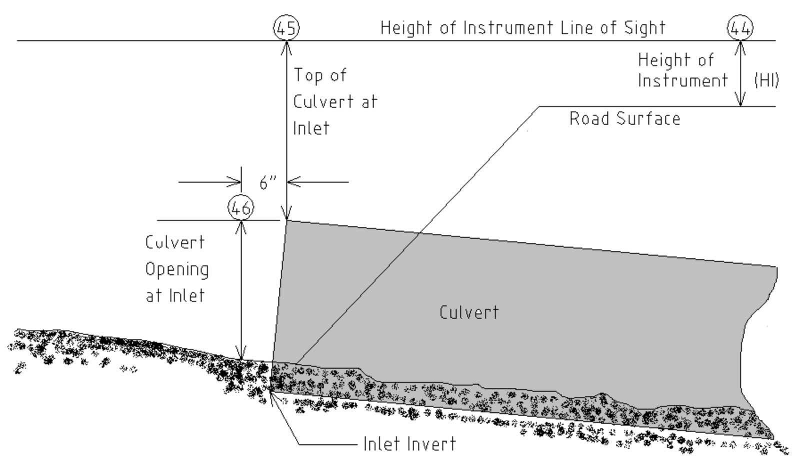
3.0 through 5.95

3. Units

Feet

4. Accuracy/Precision

+/- 0.05 feet/nearest 0.05 foot



Typical Inlet Detail

Element 45: TC_I	**Rev. 5/99**
Top of Culvert at Inlet	**Regional Data Field**

1. Instructions

The top of culvert at the inlet is measured as the vertical distance between the HI line of sight and the highest point on the top of the culvert. See Typical Inlet Detail. This measurement is used in determining the gradient of the culvert, a critical factor in computing flow velocity. Therefore, the accuracy goal is to take this measurement to the nearest 0.05 feet.

2. Valid Values (codes)

0.00 through 99.95

3. Units

Feet

4. Accuracy/Precision

+/- 0.05 feet/nearest 0.05 foot

Element 46: CO_I	**Rev. 5/99**
Culvert Opening at Inlet	**Regional Data Field**

1. Instructions

The streambed (opening) at the inlet measurement is the vertical distance measured from the top of the culvert to the streambed 6" upstream of the inlet using a rod or tape. See the Typical Inlet Detail.

2. Valid Values (codes)

0.1 through 99

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot

Element 47: BLD_C (%_BDLD)	**Rev. 5/99**
Culvert Bedload Coverage	**Regional Data Field**

1. Instruction

Culvert bedload coverage refers to the percent of the culverts length which is covered with bedload.

2. Valid Values (codes)

0 through 100

3. Units

Percent

4. Accuracy/Precision

+/- 10% nearest 10%

Element 48: BLD_T	**Rev. 5/99**
Culvert Bedload Type	**Regional Data Field**

1. Instructions

Culvert bedload refers to the dominant class of substrate particle size within the culvert. Estimate the dominant substrate particle size class.

2. Valid Values (codes)

Size limits are based on the Unified Soil Classification Use of Sand codes (FS MS CS) is optional. Use of S to include all sands is acceptable. More than one classification is permitted with separation by an underscore.

FS Fine Sand	0.08mm to 0.4mm (optional)
MS Medium Sand	0.4mm to 2.0mm (optional)
CS Coarse Sand	2.0mm to 5.0mm (optional)
S Sands	<5mm
FG Fine Gravel	5mm - 20mm
CG Coarse Gravel	20mm-80mm
SC Small Cobble	80mm - 120mm
LC Large Cobble	120mm-250mm
BO Boulder	250mm-1000mm
B	Bedrock for boulders greater than 1 meter

O	Organic materials, fine woody debris

Element 49: US_SB — **Rev. 5/99**

Upstream Substrate Type — **Regional Data Field**

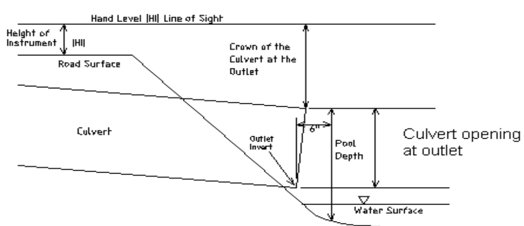
1. Instructions

Classify the stream substrate located upstream of the culvert by identifying the dominate particle size.

2. Valid Values (codes)

Size limits are based on the Unified Soil Classification.
Use of Sand codes (FS,S,CS) is optional. Use of S to include all sands is acceptable.
More than one classification is permitted with separation by an underscore.

FS Fine Sand	0.08mm to 0.4mm (optional)
MS Medium Sand	0.4mm to 2.0mm (optional)
CS Coarse Sand	2.0mm to 5.0mm (optional)
S Sands	<5mm
FG Fine Gravel	5mm - 20mm
CG Coarse Gravel	20mm-80mm
SC Small Cobble	80mm - 120mm
LC Large Cobble	120mm-250mm
BO Boulder	250mm-1000mm
B	Bedrock for boulders greater than 1 meter
O	Organics, fine woody debris



Typical Outlet Detail

Element 50: TC_O	**Rev. 5/99**
Top of Culvert at Outlet	**Regional Data Field**

1. Instructions

The top of the culvert at the outlet is measured as the vertical distance between the HI line of sight and the highest point on the top of the culvert. See Typical Outlet Detail. This measurement is used in determining the gradient of the culvert, a critical factor in computing flow velocity. Therefore, the accuracy goal is to take this measurement to the nearest 0.05 feet.

2. Valid Values (codes)

0.0 through 99.95

3. Units

Feet

4. Accuracy/Precision

+/- 0.05 feet/nearest 0.05 foot

Element 51: CO_O	**Rev. 5/99**
Culvert Opening at Outlet	**Regional Data Field**

1. Instructions

Measure the distance from the top of the culvert to a point at the average depth of the bedload in the culvert or the bottom of the culvert (which ever is less) with a rod or tape. See Typical Outlet Cross Section.

2. Valid Values (codes)

0.1 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot

Element 52: PD **Rev. 5/99**
Outlet Pool Depth **Regional Data Field**

1. Instructions

Measure the vertical distance from the top of the culvert outlet and the stream bottom. Make the measurement at a distance of 6 inches from the culvert.

2. Valid Values (codes)

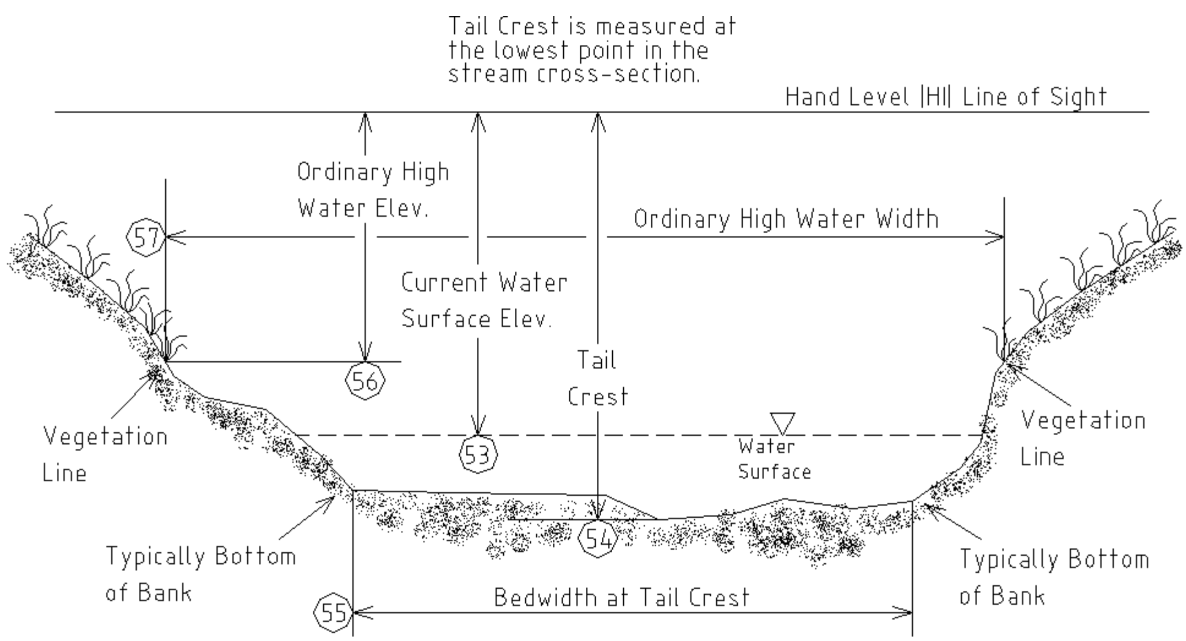
0.1 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot



Typical Tail Crest Cross-Section

Element 53: **WSE**	**Rev. 5/99**
Water Surface Elevation	**Regional Data Field**

1. Instructions

The water surface elevation is the vertical distance between the HI line of sight and the water surface of the stream at the tailcrest. See the "Typical Tailcrest Cross-Section" drawing.

2. Valid Values (codes)

0.0 through 99

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot

Element 54: **TC**	**Rev. 5/99**
Tailcrest	**Regional Data Field**

1. Instructions

The tailcrest is the vertical distance between the HI line of sight and the lowest point of the streambed at the tailcrest cross section. The tailcrest location is at the downstream end of the plunge pool or scour hole at the outlet. When installed control structures are present (i.e. log or rock weirs), the measurement is taken at the lowest point of the control structure. The location will vary between culvert, but is not expected to be more than 3 times the culvert height down stream. If there is not a pool or scour hole at the outlet, enter the observation in Notes. See the "Typical Stream Profile" and "Typical Outlet Detail" drawings.

2. Valid Values (codes)

0.0 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot

Element 55: B_TC	**Rev. 5/99**
Bed Width at Tailcrest	**Regional Data Field**

1. Instructions

The bed width at tailcrest measurement is the horizontal distance from the bottom-of-bank to the bottom-of-bank at the tailcrest cross section. See the "Typical Tailcrest Cross-Section" drawing. If there is not and identifiable tailcrest, take the measurement at approximately 3 times the culvert height downstream of the outlet.

2. Valid Values (codes)

0.1 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Element 56: OHW_O	**Rev. 5/99**
Ordinary High Water Mark Downstream	**Regional Data Field**

1. Instructions

The ordinary high water mark downstream measurement is the vertical distance between the HI line of sight and the vegetation line on one side of the channel at the tailcrest cross section. The ordinary high water mark is the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. See the "Typical Tail Crest Cross-Section" drawing. If a defined tailcrest is not located, take the measurement approximately 3 times the culvert height downstream of the outlet.

2. Valid Values (codes)

0.1 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/nearest 0.1 foot

Element 57: OHW_W	**Rev. 5/99**
Ordinary High Water Width Downstream	**Regional Data Field**

1. Instructions

The ordinary high water width downstream measurement is the horizontal distance between the ordinary high water mark on one side of the stream and the ordinary high water mark on the other side of the stream measured at the tailcrest cross section. Make the measurement as closely **as** possible to a right angle from the stream flow. See the "Typical Tailcrest Cross-Section" drawing. If there is no defined tailcrest, make the measurement approximately 3 times the culvert height downstream of the outlet.

2. Valid Values (codes)

0.1 through 99.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Element 58: Spare	**Rev. 5/99**

Element 59: SSC (CNSQ) **Rev. 5/99**
Special Site Condition **Regional Data Field**

1. Instructions

a. Potential Problems

Identify any conditions that predispose future problems or failure to perform as designated. Identify situations that can cause problems in the foreseeable future, such as, beaver, unstable upstream debris, loose slash in a unit, etc.

b. Consequences

Record special site conditions of a road condition problem recorded in parameter (PRM). If there is more than one potential problem, list additional consequence code on additional entry lines.

2. Valid Values (codes)

Code	Definition
BVU	Beaver activity upstream of drainage structure
BVD	Beaver activity downstream of drainage structure
BVB	Beaver activity both upstream and downstream of drainage structure
WDR	Unstable woody debris upstream of drainage structure
BDL	Active bedload upstream of drainage structure
SF	Produces an unsafe condition or potentially unsafe condition
FH	Apparent sediment transport potential into fish stream
WQ	Sediment transport results in degradation of water quality
SI	Effects the structural integrity of the road
OT	Other (specify in notes)
N	No significant special site condition
SD	Stream or watercourse routed into ditch (diversion)
DR	Stream or watercourse routed onto road surface (diversion)

Element 60: A_TAK **Rev. 5/99**
Action Taken **Regional Data Field**

1. Introduction

This data field has been identified as a method to record road maintenance accomplishments. Minor corrective work should be done and documented immediately. Record the action taken and type of problem that was corrected. Use the method prescribed in the "Coding Practices and Conventions" section at the beginning of this document to record culvert blockage existing before action was taken(eg., BDL60, BVR100, etc.). Supplement the information with details using the notes as needed to document work done. Note that the road maintenance work accomplishments may not be in the same spreadsheet data collected for condition surveys.

2. Valid Values (codes)

Code	Definition
N	No problem corrected
BVR	Beaver debris removed from culvert
RFL	Fill material removed from culvert
BDL	Bedload deposition removed from culvert
ORG	Organic blockage removed from culvert
SED	Sediment removed from culvert
DCH	Ditch cleaned
BSN	Catch basin cleaned
DBL	Ditch block repaired
SDG	Seeding
DIP	Rolling dip created
CRP	Culvert replaced
CIN	Culvert installed (new installation)
CHK	Field checked as part of on-going road maintenance.
RBD	Road Bladed (and rolled)
WBA	Water Bar added
OWA	Outlet Weir added
SIR	Sign Installed or Replaced
LTF	LTF serviced
GAT	Gate repaired or replaced
ADD	Additional work needed
HCC	Hand cleaned culvert (Obsolete code, use more specific codes above)
OTH	Other (specify in notes)

More than one classification is permitted with separation by an underscore.

Element 61: A_REQ	**Rev. 5/99**
Action Required	**Regional Data Field**

1. Instructions

Determine if and what kind of action is required to correct problem. Accompany all action required problems with notes for further explanation. If critical problem is encountered and can be corrected with hand labor then survey crew will act on it immediately and record the action in the A_TAK field.

2. Valid Values (codes)

Code	Definition
N	No action required
L	Light - light hand labor can correct
M	Moderate - intensive hand labor can correct
H	Minimal use of heavy equipment is required to correct problem
X	Extensive user of heavy equipment needed

Element 62: PRI	**Rev. 5/99**
Priority	**Regional Data Field**

1. Instructions

Evaluate based on special site condition. If critical problem is encountered and can be corrected with hand labor then survey crew will act on it immediately and record the action in the A_TAK field.

Emergency Need**.** An urgent maintenance need that may result in injury, illness, or loss of life, natural resource, or property; and must be satisfied immediately. Emergency needs generally require a declaration of emergency or disaster, or a finding by a line officer that an emergency exists.

Critical Need. A requirement that addresses a serious threat to public health or safety, a natural resource, or the ability to carry out the mission of the organization.

Non-critical Need. A requirement that addresses potential risk to public or employee safety or health, compliance with codes, standards, regulations, etc., or needs that address potential adverse consequences to natural resources or mission accomplishment.

2. Valid Values (codes)

Code	Definition
E	Emergency
C	Critical
N	Non-critical

Element 63: **COR**	**Rev. 5/99**
Problem Corrected	**Regional Data Field**

1. Instructions

This element is intended to show that previously recorded problems have been corrected, either through actions taken or natural means. For example, assume the following scenario: a cross-sectional feature with a parameter of cutslope erosion was previously recorded; when updating the survey it can be seen that the problem has been eliminated through successful establishment of grass. The original data cannot be flagged in the field as corrected since it resides in the office as a database file.

The solution is to update the entry on the field copy with new survey date and crew, and the action taken of 'CHK' (see Element 60). Enter 'Y' in the Problem Corrected column. This will flag the entry as one which the data steward will need to correlate with a problem recorded in the original data. The data steward will then update the Problem Corrected element of the original entry in the database to 'Y'. The intent is to retain all the historical data, but flag it so that it can be screened out before querying for existing problems.

2. Valid Values (codes)

Code	Definition
Y	Yes
N	No

Element 64: **NOTES**	**Rev. 5/99**
Notes Taken	**Regional Data Field**

1. Instructions

The valid values (codes) listed above for the previous 63 Elements are intended to be very descriptive of common road condition events. If further detail is needed, enter notes directly into the spreadsheet in the row corresponding to milepost. In order to allow efficient and consistent querying of the information in this survey, do not rely solely on the Notes column to record events for which other elements have been designed.

ROAD CONDITION SURVEY ELEMENT DEFINITIONS

SECTION II - Analysis Parameters

Sec. 2 - Element 1: RTE_NO (ROAD#)	**Rev. 5/99**
Road Number	**National Data Element (FSH)**

1. Instructions

Repeated from Section 1

2. Valid Values (codes)

System Roads to 7 digits, numeric. Non-System Roads not to exceed 20 digits, alphanumeric.

Sec. 2 - Element 2: MP	**Rev. 5/99**
Milepost	**Regional Data Element**

1. Instructions

Repeated from Section 1 as

2. Valid Values (codes)

00.000 through 999.999

3. Units

Miles

4. Accuracy/Precision

~+/-0.002 miles/mile, 0.000 mile

Sec. 2 - Element 3: YRCON	**Rev. 5/99**
Year Road Constructed	**Regional Data Field**

1. Instructions

If known, obtain the year the road was constructed from the contract records. The construction administration personnel should populate the data. Estimate to nearest five years if actual data are not available.

2. Valid values (codes)

1900 - current year

Sec. 2 - Element 4: YRCLO	**Rev. 5/99**
Year Road Closed	**Regional Data Field**

1. Instructions

Obtain the year a feature was installed to block or close the road. Engineering records are the common source for this information. Treat the date entry as a separate transaction with the closure method. If subsequent changes are made, additional transactions will indicate the differences. For vegetative closures identify the point in time when the discouraged uses are no longer able to traverse the route.

2. Valid Values (codes)

1900-current year

3. Units:

Not applicable

4. Accuracy/Precision

+/- one year

Sec. 2 - Element 5: VCU	**Rev. 5/99**
Value Comparison Unit	**Forest Data Field for Tongass NF**

1. Instruction

VCU is roughly equivalent to watershed. Obtain value from GIS. This can be entered into the database in the office.

2. Valid Values (codes)

100 through 599 (not all inclusive)

Sec. 2 - Element 6: WATSHD	**Rev. 5/99**
Watershed Minor Number	**GIS data - Optional Field**

1. Instructions

Record watershed minor number. In some cases where the road is close to the shoreline, there may not be a watershed number. Obtain value from GIS. This can be entered into database in the office.

2. Valid Values (codes)

4 digit, numeric

Sec. 2 - Element 7: HILL_P	**Rev. 5/99**
Hill Slope Position	**Regional GIS Data or Field Data**

1. Instructions

Use topographic maps and the GIS slope class layer to determine the hill slope position for selected road segment, or identify the position if collecting field data to monitor GIS results. Best done by field crew based on characteristics.

2. Valid Values (codes)

Code	Description
VB	Valley Bottom
FS	Foot Slope
MS	Mid-Slope
SS	Shoulder Slope
RT	Ridge Top

Sec. 2 - Element 8: AREA	**Rev. 5/99**
Area	**Optional Forest Data Field**

1. Instructions

The area of erosion, defined by Length and Width.

2. Valid Values (codes)

10 to 100,000

3. Units

Feet

4. Accuracy/Precision

+/- 10 $feet^2$

Sec. 2 - Element 9: I_EL	**Rev. 5/99**
Culvert Cover at Inlet	**Regional Data Field**

1. Instructions

Look for culverts where the cover is less than one foot or more than 10 feet. Skip all others.

2. Valid Values (codes)

0.0 through 99

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Sec. 2 - Element 10: O_EL	**Rev. 5/99**
Culvert cover at outlet	**Regional Data Field**

1. Instructions

Look for culverts where the covers are less than 1 foot or more than 10 feet. Skip all others.

2. Valid Values (codes)

0.0 through 99

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Sec. 2 - Element 11: H2O_STG	**Rev. 5/99**
Percent Ordinary High Water	**Optional Forest Data Field**

1. Instruction

2. Valid Values (codes)

0 through 100

3. Units

Percent

4. Accuracy/Precision

+/- 10%/nearest 10%

Sec. 2 - Element 12: VELOCITY	**Rev. 5/99**
2 Year, 2 Day Flow	**Optional Field (Stikine Field Evaluation)**

1. Instructions

The velocity of the water within the culvert is obtained by using a velocity board, meter or timing a floating object over a measured distance. Attempt to measure at a point located 1/3 the culvert length from the inlet.

2. Valid Values (code)

0.0 through 9.9

3. Units

Feet/sec

4. Accuracy/Precision

+/-0.1 feet/sec nearest 0.1 foot/sec

Sec. 2 - Element 13: PRCH_IN	**Rev. 5/99**
Perch Height at Inlet	**Regional Data Field**

1. Instructions

Perched Height is the vertical distance between the bottom of the culvert to the top of the water at the inlet end of the culvert.

2. Valid Values (codes)

0.0 through 9.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/ 0.1 feet

Sec. 2 - Element 14: PRCH_O_I **Rev. 5/99**
Perch Height at Outlet - Flow Independent **Regional Data Field**

1. Instructions

Perched Height is the vertical distance between the bottom of the culvert to the top of the water at the outlet end of the culvert.

2. Valid Values (codes)

0.0 through 9.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Sec. 2 - Element 15: PRCH_O_D **Rev. 5/99**
Perch Height at Outlet - Flow Dependent **Regional Data Field**

1. Instructions

Perched Height is the vertical distance between the bottom of the culvert to the top of the water at the outlet end of the culvert.

2. Valid Values (codes)

0.0 through 9.9

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Sec. 2 - Element 16: BDLD_I	**Rev. 5/99**
Bedload Depth at Inlet	**Regional Data Field**

1. Instruction

Culvert bedload depth refers to the depth of the bedload inside the culvert at the inlet. For bottomless arches specify depth above or below the top of the footing (use negative number for amount below).

2. Valid Values (codes)

0.0 through 9.0 (negative if below footing on bottomless arches)

3. Units

Feet

4. Accuracy/Precision

+/- 0.05 feet/nearest 0.1 foot

Sec. 2 - Element 17: BDLD_O	**Rev. 5/99**
Bedload Depth at Outlet	**Regional Data Field**

1. Instruction

Culvert bedload depth refers to the depth of the bedload inside the culvert at the oultet. For bottomless arches specify depth above or below the top of the footing (use negative number for amount below).

2. Valid Values (codes)

0.0 through 9.0 (negative if below footing on bottomless arches)

3. Units

Feet

4. Accuracy/Precision

+/- 0.05 feet/nearest 0.1 foot

Sec. 2 - Element 18: OP_TC **Rev. 5/99**
Outlet Pool Tailcrest Depth **Regional Data Field**

1. Instructions

2. Valid Values (codes)

0.0 through 99

3. Units

Feet

4. Accuracy/Precision

+/- 0.1 feet/0.1 feet

Sec. 2 - Element 19: CUL_G **Rev. 5/99**
Culvert Gradient **Regional Data Field**

1. Instructions

Culvert Gradient refers to the gradient at which the culvert is laid.

2. Valid Values (codes)

0 through 99

3. Units

Percent Gradient

4. Accuracy/Precision

+/- 1%

Sec. 2 - Element 20: SGN_TYP	**Rev. 5/99**
Sign Type	**Regional Data Field**

1. Instructions

Record the code for type of forest road sign using standard Forest Service sign codes. If milepost sign, simply enter milepost on sign as code in spreadsheet (e.g., milepost 9, record and mp9).

2. Valid Values (codes)

See Sign Appendix for sign codes.

ROAD CONDITION SURVEY ELEMENT DEFINITIONS

SECTION III - Associated Survey Parameters

Sec. 3 - Element 1: RTE_NO (ROAD#)	**Rev. 5/99**
Road Number	**National Data Element (FSH)**

1. Instructions

Repeated from Section 1

2. Valid Values (codes)

System Roads to 7 digits, numeric. Non-System Roads not to exceed 20 digits, alphanumeric.

Sec. 3 - Element 2: MP	**Rev. 5/99**
Milepost	**Regional Data Element**

1. Instructions

Repeated from Section 1 as

2. Valid Values (codes)

00.000 through 999.999

3. Units

Miles

4. Accuracy/Precision

~+/-0.002 miles/mile, 0.000 mile

Sec. 3 - Element 3: HABS	**Rev. 5/99**
Fish Habitat Suitability	**Regional Data Field**

1. Instructions

Determine the kind of fish habitat immediately downstream or immediately upstream or both upstream and downstream of the structure. The standard for minimum habitat reach is 100 feet of stream reach. While the presence of fish is considered a positive proff of use of fish habitat, the absence of fish can not be taken as the opposite. Multiple line coding may be needed in some situations.

2. Valid Values (codes)

First Character
A Habitat suitable for anadromous fish is present (code in species fields)
R Habitat suitable for resident fish is present (code in species fields)
N Habitat is not suitable for resident or anadromous fish

Second Character
S Spawning habitat
R Rearing habitat
O Overwintering habitat

EXAMPLES OF X-SECTION FEATURES

- Fillslope erosion
- Cutslope erosion
- Surface erosion
- Cracks in road prism
- Washout
- Ditch problems

Appendix B-1 Fillslope erosion above a fish stream, seed was applied.

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	FE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	MT	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	8	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	20	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	3	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	FH
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	SDG
28	Channel Type	CT		61	Action Required	A_REQ	L
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	N
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Crack in road

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SF	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	SC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID		46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	3	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	SI
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	N
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1

Cutslope erosion next to a fish stream

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	CE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	OS	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	10	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	60	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	2	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	FH
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	L
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1 Road washout due to culvert plugged by woody debris

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM	WO	40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	WDC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	1.5	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	3	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	20	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G		56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	SI
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	N
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Slide across road

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	BC	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM		39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM	SLD	40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	FS	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	5	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	30	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	50	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK	100	53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	3	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	N
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	N
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1

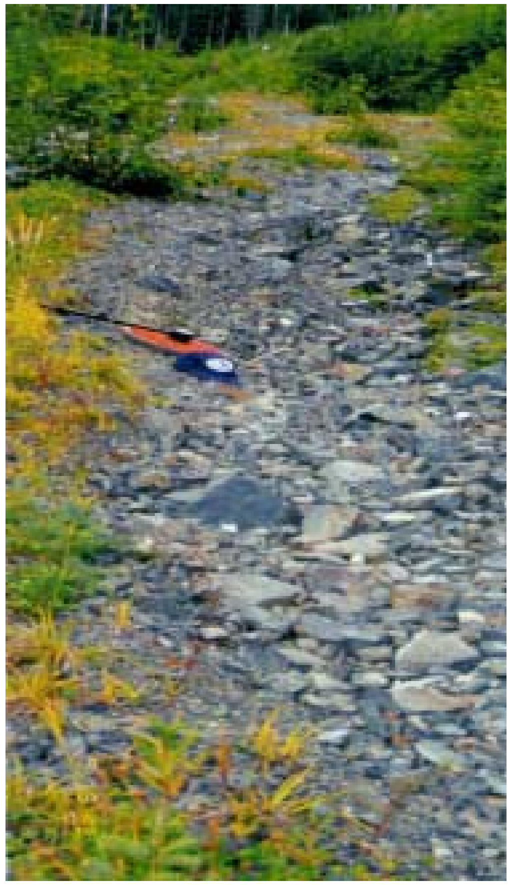
Catch basin intact and functioning.

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	DR	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	N	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	18	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	18	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN		47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB	N	49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB	I	50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE	N	51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE	N	52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G		56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	
28	Channel Type	CT		61	Action Required	A_REQ	
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Stream diverted down ditch and across road due to plugged culvert.

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	FE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	SD	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	0.5	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	15	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	20	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	0	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	DR
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1 Water running down a spur road, no fish streams nearby.



No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	WR	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	EC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	0.9	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	4	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	60	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	12	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	DR
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	N
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1

Cutslope slumping into culvert

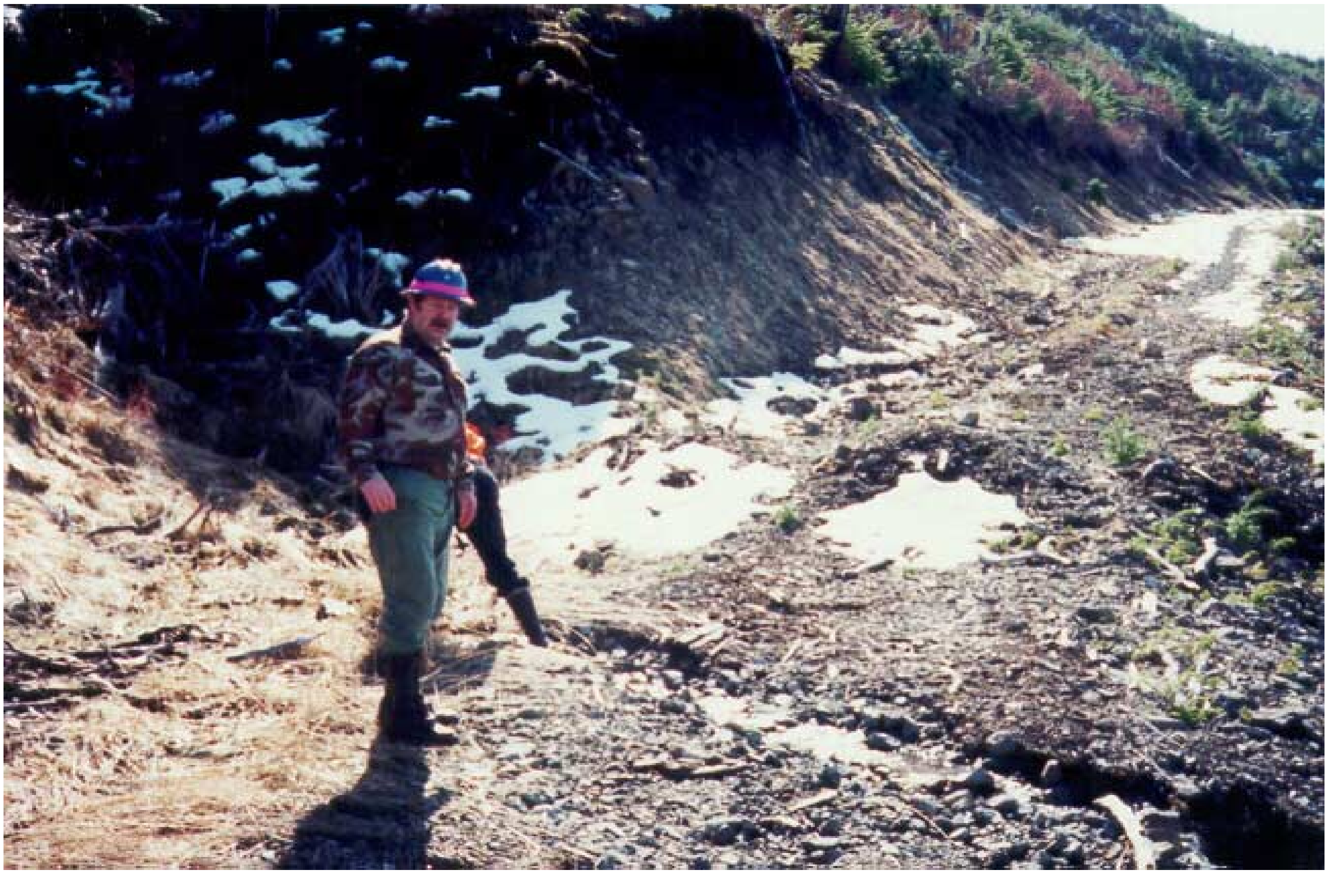
No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	DR	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	CSC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	18	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	18	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK	0	53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G		56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	BSN30
28	Channel Type	CT		61	Action Required	A_REQ	N
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1

Stream diversion down ditch

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	DE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	SDC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID		46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	100	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	18	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	SD
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1 Surface erosion in association with inadequate water bar



No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	EC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	10	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	20	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	10	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	DR
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	ADD
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Appendix B-1

Ditch erosion

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	XS	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	DE	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	SD	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	4	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	200	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT		48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	15	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	WQ
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

EXAMPLES OF CULVERT PROBLEMS

- Inlet erosion
- Outlet erosion
- Blockage
- Structural Damage
- Perched Culvert

Road prism failure caused by undercut footing on an open bottom arch.

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	BT
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CO	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	ST	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID		46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN		47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE	F	52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD	999	54	RR Tailcrest	TC	
22	Skew Angle	SKEW	3	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	2	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	1	59	Special Site Condition	SSC	SI
27	Downstream Gradient	D_GD	1	60	Action Taken	A_TAK	N
28	Channel Type	CT	FP	61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	C
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Inlet scour has eroded road fill material.

1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	AR2	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	MT	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	48	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	72	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE	F	51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE	N	52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	0	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	0	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	25	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	2	59	Special Site Condition	SSC	SI
27	Downstream Gradient	D_GD	1	60	Action Taken	A_TAK	N
28	Channel Type	CT	FP	61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	N
30	Fish Habitat	HAB	B	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Beaver dam 15 feet above culvert inlet

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CO	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	BV	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	37	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	72	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	38	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW		55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G		56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	12	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	1	59	Special Site Condition	SSC	BVU
27	Downstream Gradient	D_GD	1	60	Action Taken	A_TAK	N
28	Channel Type	CT	FP	61	Action Required	A_REQ	N
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	
30	Fish Habitat	HAB	U	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	MT	64	Notes	NOTES	

Appendix B-1 Inlet erosion has caused fillslope material to block culvert inlet.

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	BT
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	FS	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	60	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	60	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE	F	51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE	N	52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK	40	53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	3	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	2	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	12	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	5	59	Special Site Condition	SSC	BDL
27	Downstream Gradient	D_GD	3	60	Action Taken	A_TAK	N
28	Channel Type	CT	MM	61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU	2	62	Priority	PRI	C
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Blocked pipe

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	60	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	OT	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT		45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	60	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	60	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	30	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK	50	53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	0	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	0	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	15	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	1	59	Special Site Condition	SSC	BDL
27	Downstream Gradient	D_GD	1	60	Action Taken	A_TAK	N
28	Channel Type	CT	AF	61	Action Required	A_REQ	X
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	C
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Appendix B-1

Open bottom arch footing is failing

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CO	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	ST	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	48	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	36	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	28	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD	25	54	RR Tailcrest	TC	
22	Skew Angle	SKEW	2	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	3	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	8	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	3	59	Special Site Condition	SSC	OT
27	Downstream Gradient	D_GD	2	60	Action Taken	A_TAK	N
28	Channel Type	CT	MM	61	Action Required	A_REQ	X
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	N
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Appendix B-1 Mass failure upstream caused structure to become blocked

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	DS
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	SDC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	?	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	72	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK	80	53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	2	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	2	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	15	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	1	59	Special Site Condition	SSC	SI/FH
27	Downstream Gradient	D_GD	1	60	Action Taken	A_TAK	N
28	Channel Type	CT	AF	61	Action Required	A_REQ	X
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	C
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Inlet erosion causing road failure

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	DS
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	EC	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	60	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	60	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	MIT	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE	F	51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	0	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	0	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	15	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	4	59	Special Site Condition	SSC	SI
27	Downstream Gradient	D_GD	3	60	Action Taken	A_TAK	N
28	Channel Type	CT	MM	61	Action Required	A_REQ	X
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	C
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Appendix B-1

Mechanical damage at culvert inlet

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	BT
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	MP	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	60	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	60	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	MIT	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK	20	53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD	20	54	RR Tailcrest	TC	
22	Skew Angle	SKEW	0	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	2	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	12	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	8	59	Special Site Condition	SSC	OT
27	Downstream Gradient	D_GD	6	60	Action Taken	A_TAK	N
28	Channel Type	CT	HC	61	Action Required	A_REQ	H
29	Verified Aquatic Habitat Class	AHMU	2	62	Priority	PRI	C
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Appendix B-1

Damaged and perched outlet

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	MP	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	48	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	48	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	MIT	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD	5	54	RR Tailcrest	TC	
22	Skew Angle	SKEW	3	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	4	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	9	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	3	59	Special Site Condition	SSC	OT
27	Downstream Gradient	D_GD	3	60	Action Taken	A_TAK	N
28	Channel Type	CT	MM	61	Action Required	A_REQ	M
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	N
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Appendix B-1

Fillslope erosion and perched outlet

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	BT
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL		42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	48	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	48	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE	N	51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE	F	52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	0	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	2	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	8	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	5	59	Special Site Condition	SSC	FH
27	Downstream Gradient	D_GD	3	60	Action Taken	A_TAK	N
28	Channel Type	CT	MM	61	Action Required	A_REQ	M
29	Verified Aquatic Habitat Class	AHMU	2	62	Priority	PRI	N
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

Perched outlet

No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	BT
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	BT
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	SC	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	IB	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	48	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	48	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	30	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD		54	RR Tailcrest	TC	
22	Skew Angle	SKEW	0	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	0	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US	8	57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD	3	59	Special Site Condition	SSC	OT
27	Downstream Gradient	D_GD	3	60	Action Taken	A_TAK	N
28	Channel Type	CT	MM	61	Action Required	A_REQ	M
29	Verified Aquatic Habitat Class	AHMU	1	62	Priority	PRI	N
30	Fish Habitat	HAB	BT	63	Problem Corrected	COR	
32	Fish Sampling Method	SMP	ES	64	Notes	NOTES	

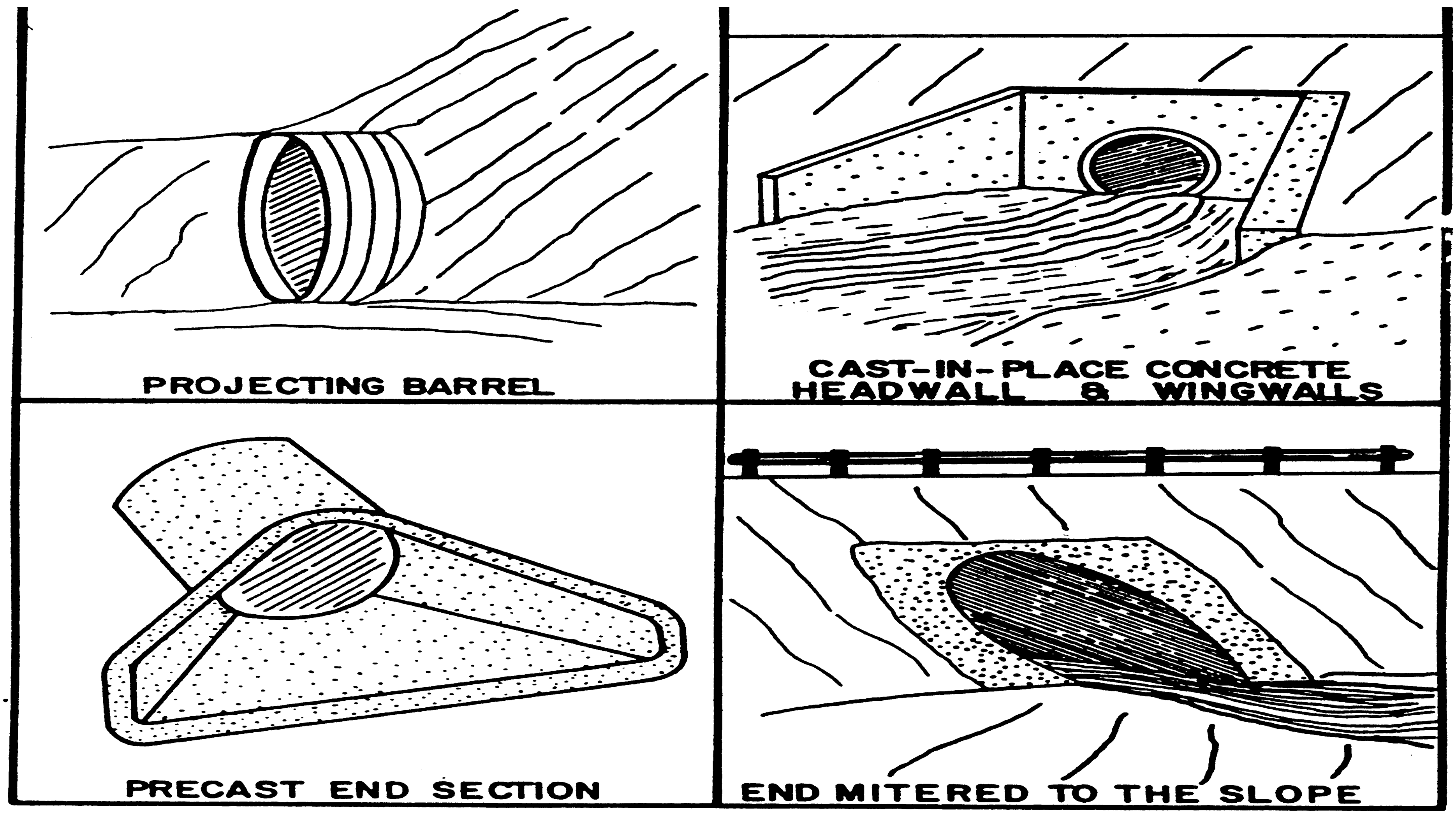
Crushed inlet on cross drain

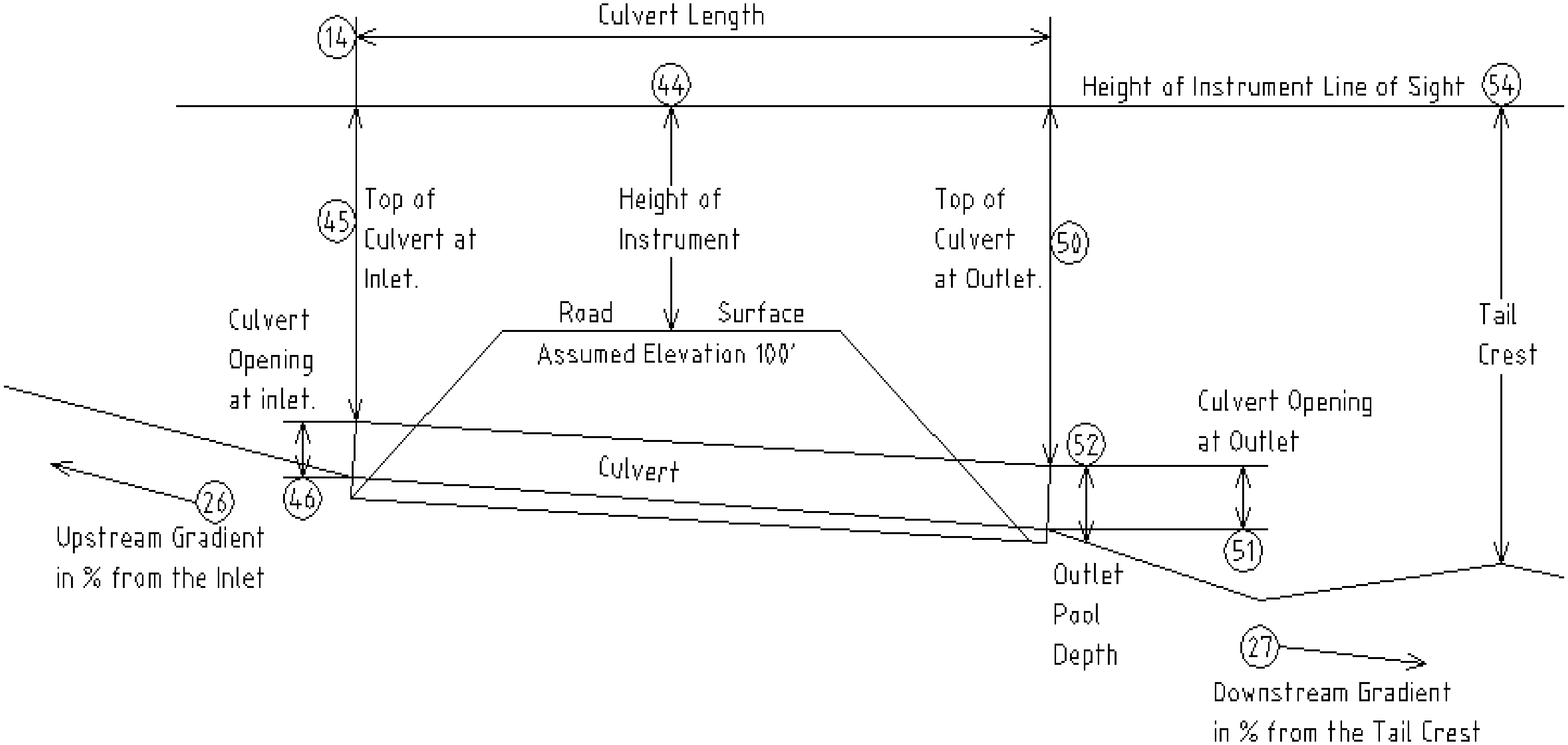
No.	Element	Abbrev.	Code	No.	Element	Abbrev.	Code
1	Road Number	RTE_NO	XXXXX	33	Silver Salmon Presence	SS	
2	Milepost	MP	0.000	34	Cutthrout Presence	CT	
3	Road System	SYS	XX	35	Dolly Varden Presence	DV	
4	Sampling Crew	CREW	XXXXX	36	Steelhead Presence	SH	
5	Date	DATE	XXXXX	37	Chum Salmon Presence	CS	
6	Feature	FEAT	CP	38	King Salmon Presence	KS	
7	Descriptive Parameter	PRM	DR	39	Pink Salmon Presence	PS	
8	Access and Travel Management	ATM		40	Sockeye Salmon Presence	RS	
9	Sign Condition	SGN_C		41	Sculpin Presence	SC	
10	Failure Mechanism	FAIL	MP	42	Stickleback Presence	SB	
11	Photograph	PIC	Y	44	Height of Instrument	HI	
12	Height of feature	HGT	24	45	RR Top of Culvert at Inlet	TC_I	
13	Width of feature	WID	24	46	Culvert Opening at Inlet	CO_I	
14	Length of feature	LEN	28	47	Culvert Bedload Coverage	BLD_C	
15	Entrance Type	ENT	PRO	48	Culvert Bedload Type	BLD_T	
16	Ditch Block	DB		49	Upstream Substrate Type	U_SB	
17	Catch Basin	CB		50	RR Top of Culvert at Outlet	TC_O	
18	Inlet Erosion	IE		51	Culvert Opening at Outlet	CO_O	
19	Outlet Erosion	OE		52	Depth 6" Downstream of Outlet	PD	
20	% Block	BLK		53	RR Water Surface Elevation	WSE	
21	% Structure Damage	SD	100	54	RR Tailcrest	TC	
22	Skew Angle	SKEW	5	55	RR OHW Mark at Outlet	OHW_O	
23	Road Grade	RD_G	5	56	Bed Width at Tailcrest	B_TC	
25	Bedwidth Upstream of Inlet	B_US		57	RR OHW Width at Tailcrest	OHW_W	
26	Upstream Gradient	U_GD		59	Special Site Condition	SSC	SI
27	Downstream Gradient	D_GD		60	Action Taken	A_TAK	N
28	Channel Type	CT		61	Action Required	A_REQ	X
29	Verified Aquatic Habitat Class	AHMU		62	Priority	PRI	C
30	Fish Habitat	HAB		63	Problem Corrected	COR	
32	Fish Sampling Method	SMP		64	Notes	NOTES	

Fish Pipe Measurements

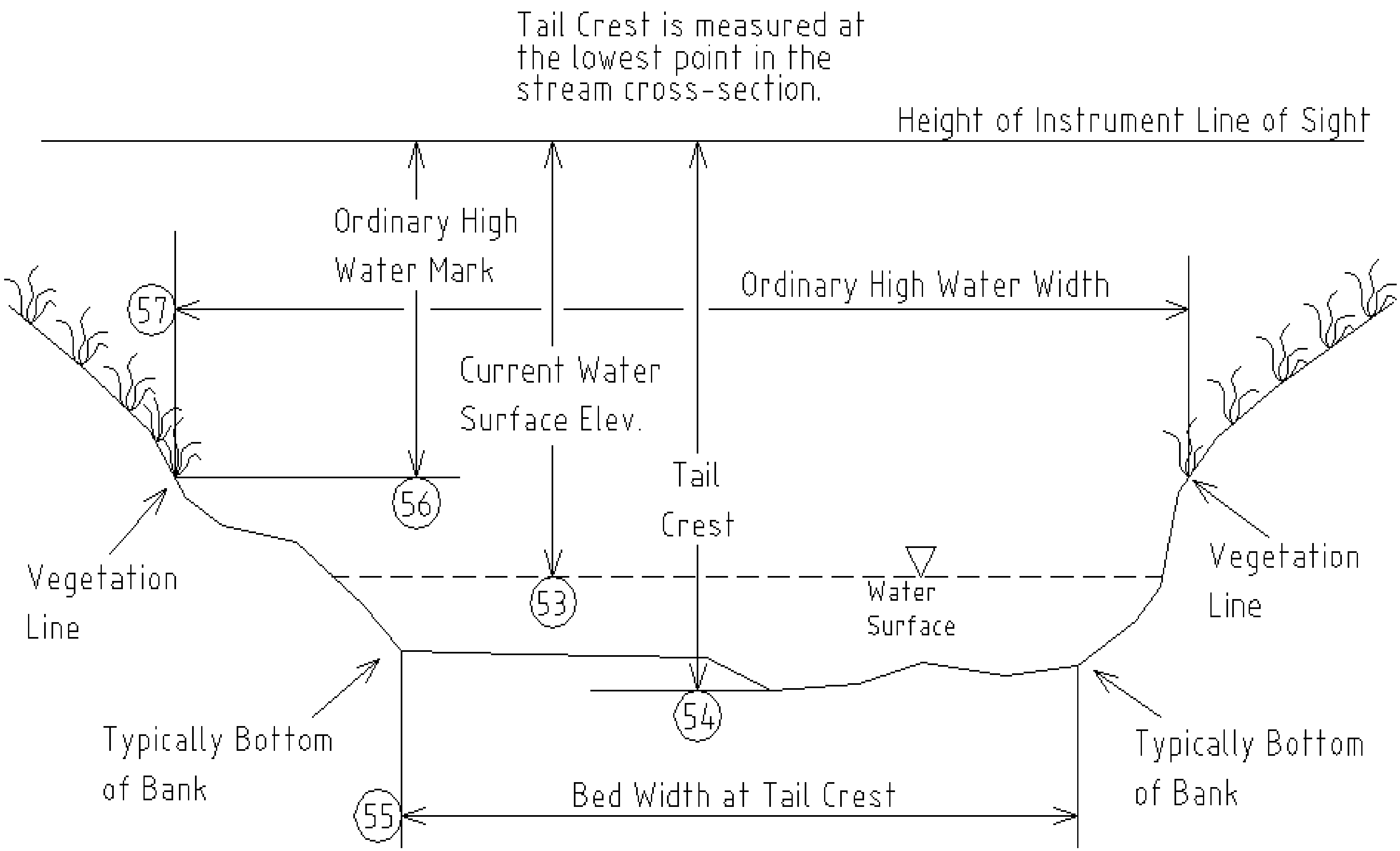
- Height of Instrument
- RR Top of Culvert at Inlet
- Culvert Opening at Inlet
- Culvert Bedload Coverage
- Culvert Bedload Type
- Upstream Substrate Type
- RR Top of Culvert at Outlet
- Culvert Opening at Outlet
- Depth 6" Downstream of Outlet
- RR Water Surface Elevation
- RR Tailcrest
- RR OHW Mark at Outlet
- Bed Width at Tailcrest
- RR OHW Width at Tailcrest

Other Training Info

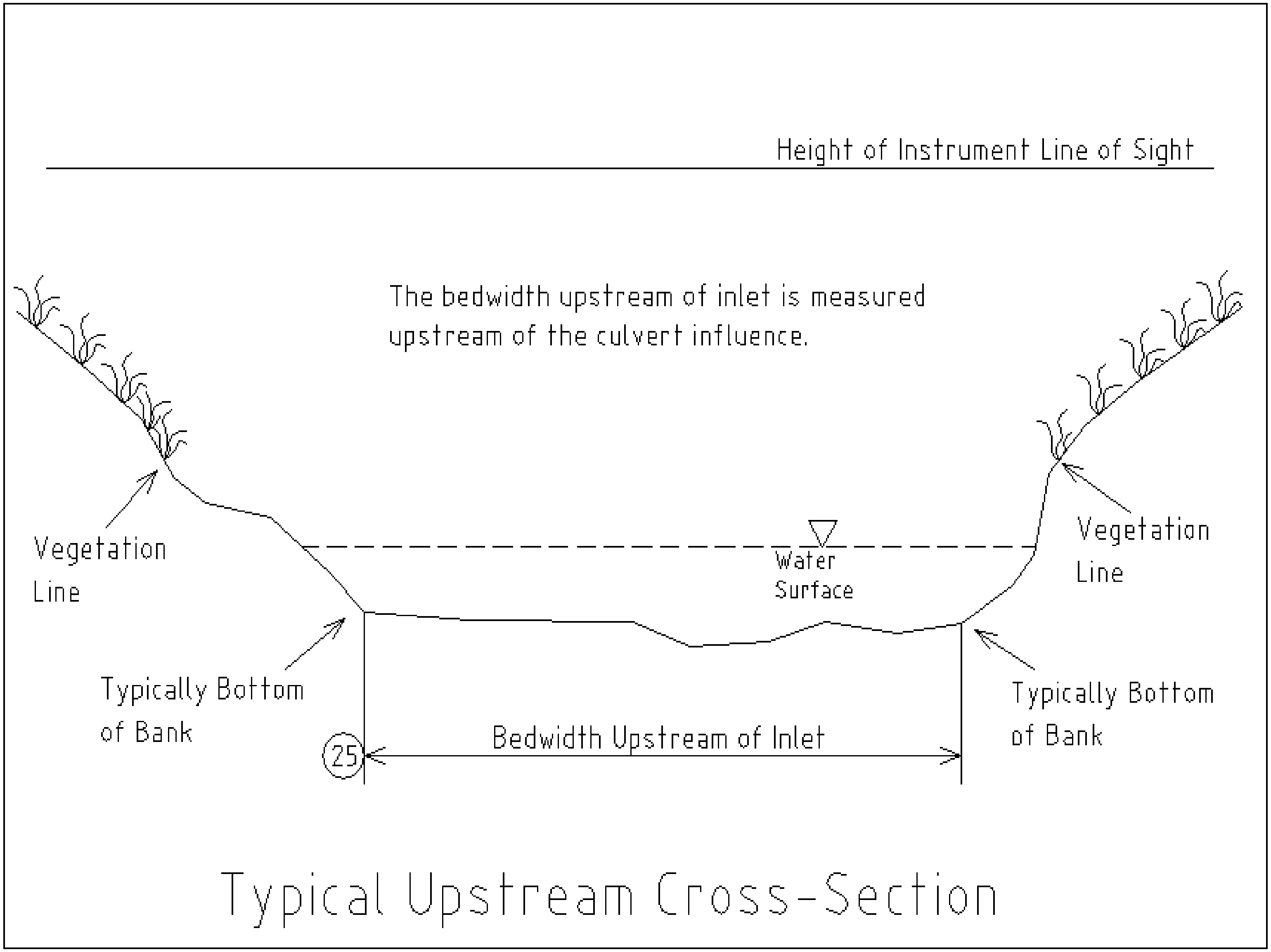

PROJECTING BARREL
CAST-IN-PLACE CONCRETE HEADWALL & WINGWALLS
PRECAST END SECTION
END MITERED TO THE SLOPE



Typical Stream Profile and Road Cross-Section



Typical Tail Crest Cross-Section


Height of Instrument Line of Sight
The bedwidth upstream of inlet is measured
upstream of the culvert influence.
Vegetation
Line
Water
Surface
Vegetation
Line
Typically Bottom
of Bank
Typically Bottom
of Bank
25
Bedwidth Upstream of Inlet
Typical Upstream Cross-Section

APPENDIX C

EQUATIONS USED FOR FISH PASSAGE ANALYSIS

Tailcrest Perch Height :

(Tailcrest) - (Top of Culvert at Outlet) - (Culvert Opening at Outlet)

Water Surface Elevation Perch Height:

(Water surface elevation at tailcrest) - (Top of Culvert at Outlet) - (Culvert Opening at Outlet)

Culvert Gradient:

((Top of Culvert at Outlet - Top of Culvert at Inlet) ÷ Culvert Length) x 100

Bedload Depth at Inlet:

(Culvert Height ÷ 12) - (Culvert Opening at Inlet)

Invert Bedload Percent:

((Bedload Depth at Inlet) ÷ (Culvert Height)) ÷ 12) x 100

Culvert/Bedwidth Ratio:

((Culvert Bedwidth) ÷ 12) ÷ Upstream Bedwidth

APPENDIX D

SAMPLE OF ANALYSIS USING FISH XING

Culvert Report for Unnamed Culvert

Project: GREY PIPES

Culvert Location Information

Road: 6407
Mile Post: 3.176

Comments:
GREEN, check photo, sunken pipe.

Biological Data

Species: Juvenile Cutthroat Trout
Fish Length: 90 mm
Minimum Water Depth: 0.1 ft.
Migration Period: September to October
Prolonged Swimming Speed: 1.5 ft/s
Prolonged Time to Exhaustion: 30 min.
Burst Swimming Speed: 4 ft/s
Burst Time to Exhaustion: 5 s
Jumping Speed: 4 ft/s
Velocity Reduction Factors:

Inlet:	0.80
Barrel:	0.40
Outlet:	0.80

Culvert Installation Data

Culvert Type: 60 X 46 in Pipe-Arch
Construction: CMP (3 X 1 in corr.)
Installation: Sunken
Countersunk Depth: 0.25 ft.
Culvert Length: 44 ft.
Culvert Slope: 1.36%
Culvert Roughness Coefficient: 0.027
Natural Bottom Roughness Coefficient: 0.03
Inlet Invert Elevation: 87.24 ft.
Outlet Invert Elevation: 86.64 ft.
Inlet Headloss Coefficient (Ke): 0.7

Design Flows

Low Passage Flow: 1 cfs
High Passage Flow: 4.5 cfs

Table 1. Uniform Flow Calculations.

Discharge (cfs)	Velocity (ft/s)	Normal Depth (ft)	Critical Depth (ft)	Outlet Velocity (ft/s)	Tailwater Depth (ft)	Pool Depth (ft)	Min Rqd Leap Velocity (ft/s)	Vert Leap Distance (ft)	Comments
0.00	0.00	0.00	0.00	0.00	0.16	0.00			
0.37	0.48	0.10	0.08	0.49	0.23	0.07	0.00	0.00	
1.00	0.69	0.18	0.15	0.99	0.30	0.14	0.00	0.00	LPF
1.22	0.75	0.20	0.17	1.14	0.31	0.15	0.00	0.00	
2.47	0.96	0.30	0.26	1.79	0.39	0.23	0.00	0.00	
4.08	1.15	0.40	0.36	2.43	0.46	0.30	0.00	0.00	
4.50	1.19	0.42	0.38	2.59	0.48	0.32	0.00	0.00	HPF
6.02	1.31	0.50	0.46	3.10	0.53	0.37	0.00	0.00	
8.28	1.46	0.60	0.56	3.73	0.59	0.43	0.00	0.00	

Comment Codes:
- LPF - Low Passage Flow
- HPF - High Passage Flow
- Depth - Insufficient Depth
- Vel - Excessive Velocity
- Leap - Excessive Leap
- Pool - Shallow Leap Pool

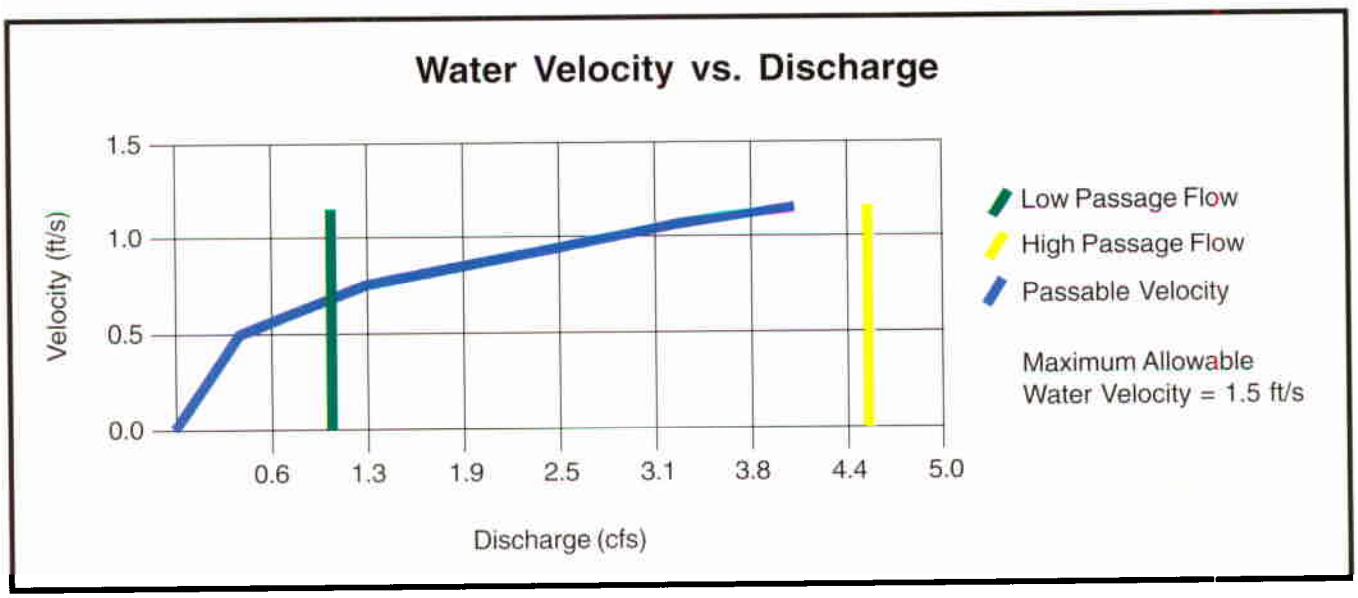


Figure 1. Velocity at Uniform Flow

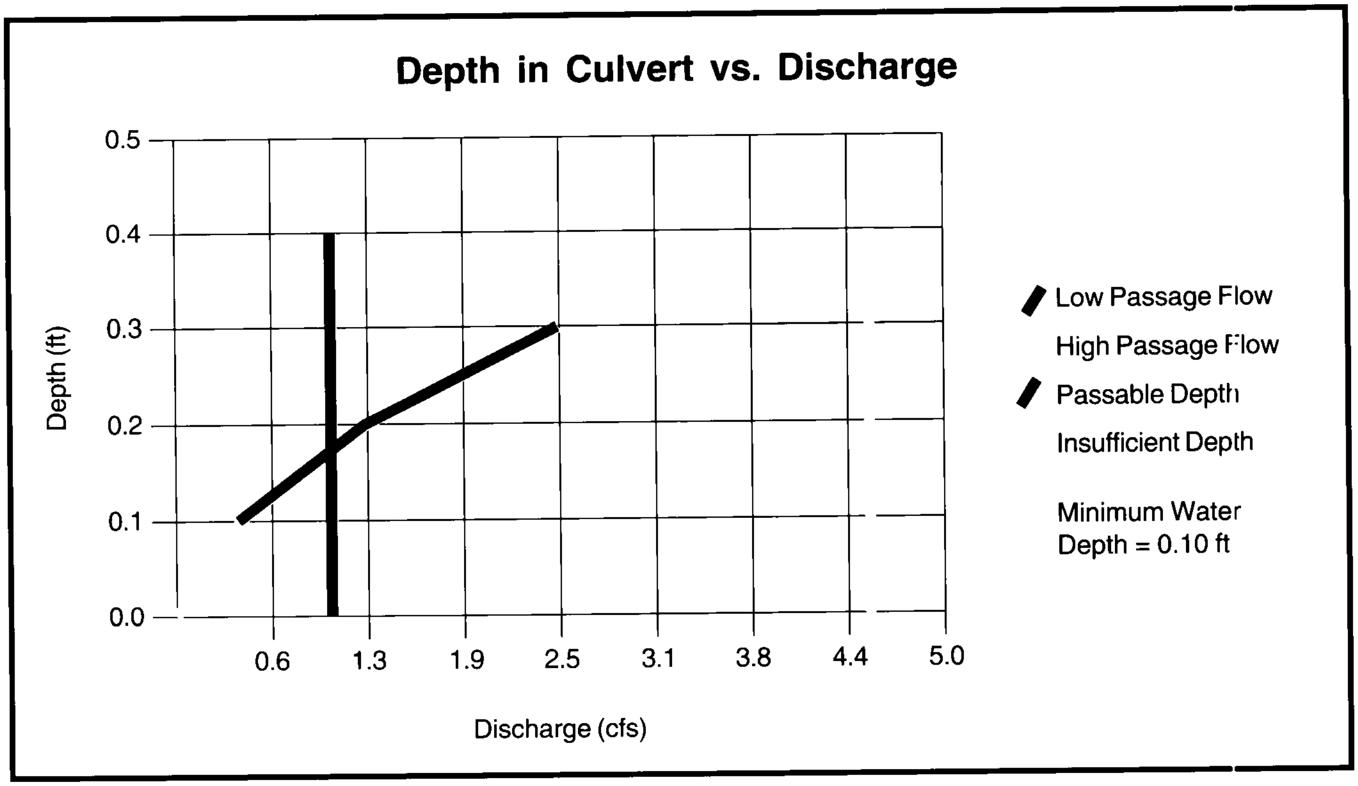


Figure 2. Depth at Uniform Flow

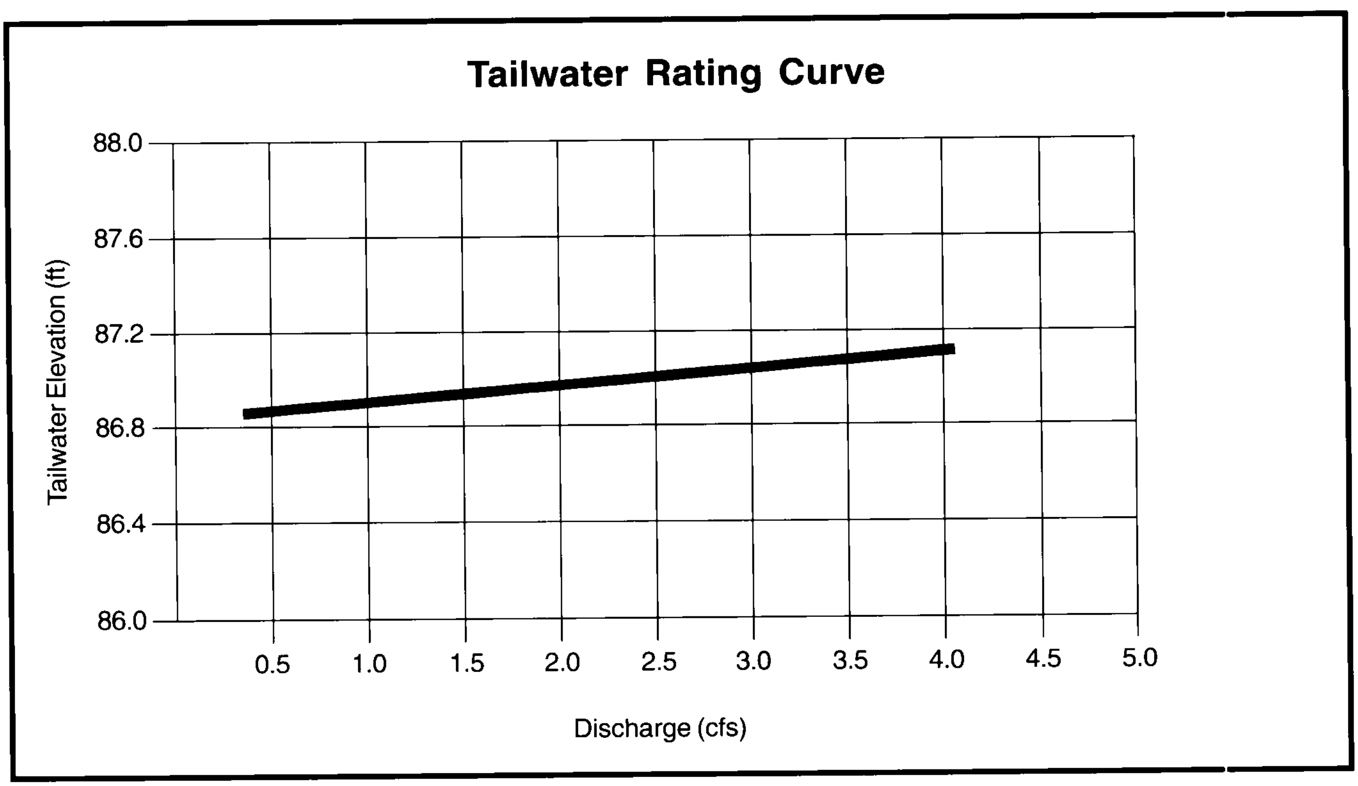


Figure 3. Tailwater Rating Curve at Uniform Flow

Table 2. Gradually Varied Flow Calculations for 1 cfs.

Q = 1.0 cfs				
Dist Down Culvert (ft)	Depth (ft)	Velocity (ft/s)	Curve	Swim Mode
0	0.26	0.00	Inlet	
2	0.18	2.26	Normal	Burst
4	0.18	1.74	Normal	Prolonged
7	0.18	1.74	Normal	Prolonged
10	0.18	1.74	Normal	Prolonged
13	0.18	1.74	Normal	Prolonged
16	0.18	1.74	Normal	Prolonged
19	0.18	1.74	Normal	Prolonged
22	0.18	1.74	Normal	Prolonged
25	0.18	1.74	Normal	Prolonged
28	0.18	1.74	Normal	Prolonged
31	0.18	1.74	Normal	Prolonged
34	0.19	1.63	M1	Prolonged
37	0.21	1.42	M1	Prolonged
40	0.25	1.22	M1	Prolonged
44	0.30	0.99	M1	Prolonged

Table 3. Gradually Varied Flow Specifications for 1 cfs.

	1.0 cfs
Normal Depth (ft)	0.18
Critical Depth (ft)	0.15
Headwater Depth (ft)	0.26
Inlet Velocity (ft/s)	2.26
Tailwater Depth (ft)	0.30
Burst Swim Time (s)	0.91
Prolonged Swim Time (m	0.83
Barrier Code	NONE

Barrier Codes

NONE - No Barrier

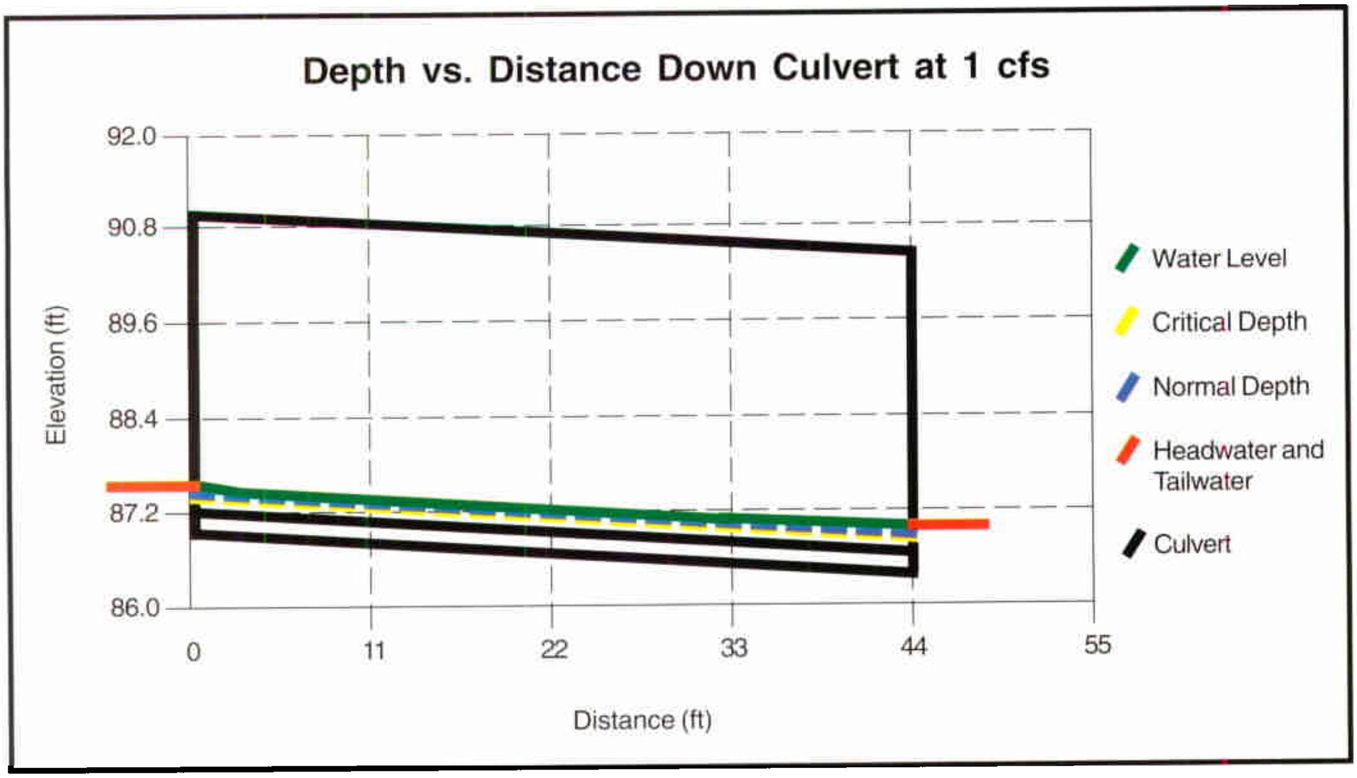


Figure 4. Water Surface Profile at 1 cfs.

Table 4. Gradually Varied Flow Calculations for 2 cfs.

Q = 2.0 cfs				
Dist Down Culvert (ft)	Depth (ft)	Velocity (ft/s)	Curve	Swim Mode
0	0.40	0.00	Inlet	
2	0.27	2.84	M1	Burst
4	0.27	2.18	M1	Prolonged
7	0.27	2.18	M1	Prolonged
10	0.27	2.18	M1	Prolonged
13	0.27	2.18	M1	Prolonged
16	0.27	2.18	M1	Prolonged
19	0.27	2.18	M1	Prolonged
22	0.27	2.18	M1	Prolonged
25	0.27	2.18	M1	Prolonged
28	0.27	2.18	M1	Prolonged
31	0.27	2.18	M1	Prolonged
34	0.28	2.12	M1	Prolonged
37	0.30	1.98	M1	Prolonged
40	0.32	1.79	M1	Prolonged
44	0.37	1.55	M1	Prolonged

Table 5. Gradually Varied Flow Specifications for 2 cfs.

	2.0 cfs
Normal Depth (ft)	0.27
Critical Depth (ft)	0.23
Headwater Depth (ft)	0.40
Inlet Velocity (ft/s)	2.84
Tailwater Depth (ft)	0.37
Burst Swim Time (s)	1.16
Prolonged Swim Time (m)	1.08
Barrier Code	NONE

Barrier Codes
NONE - No Barrier

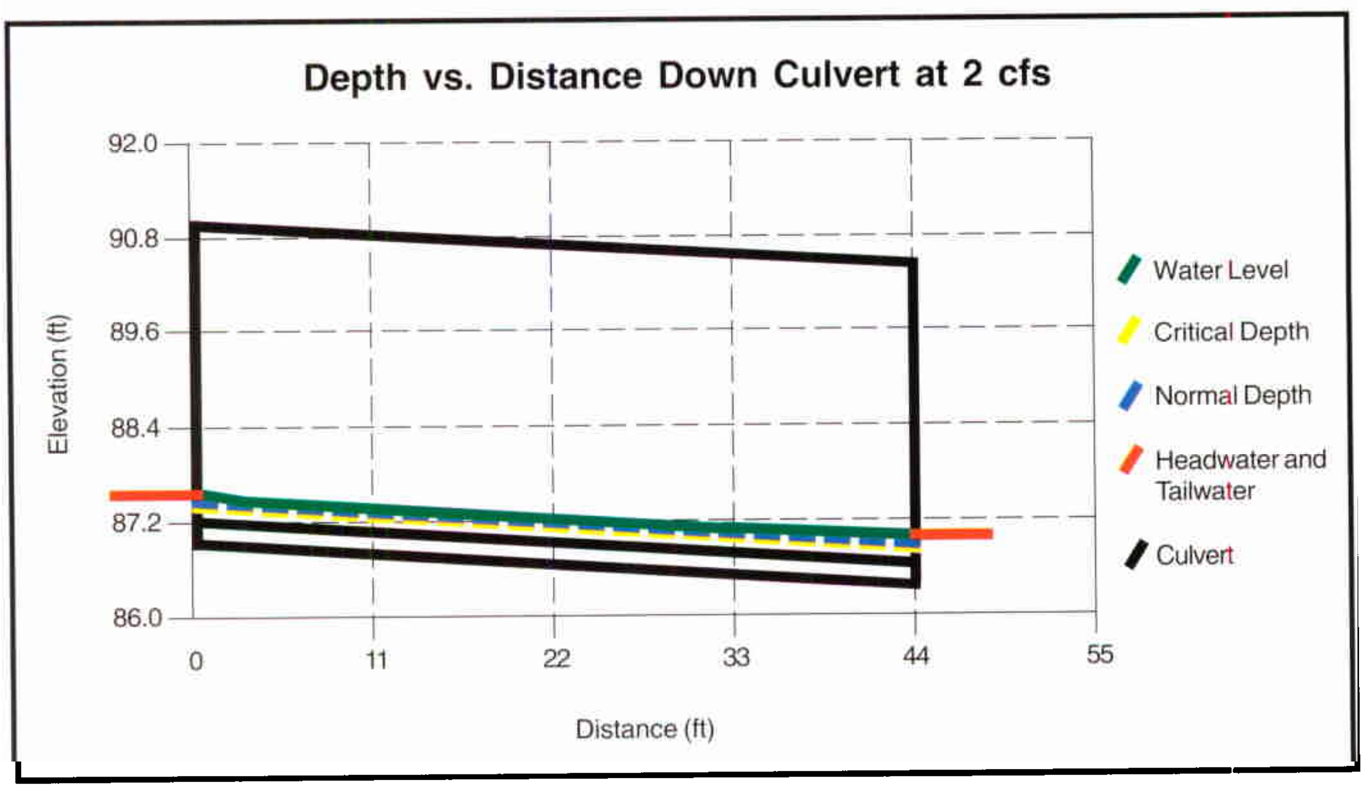


Figure 5. Water Surface Profile at 2 cfs.

Table 6. Gradually Varied Flow Calculations for 4.5 cfs.

Q = 4.5 cfs				
Dist Down Culvert (ft)	Depth (ft)	Velocity (ft/s)	Curve	Swim Mode
0	0.66	0.00	Inlet	
2	0.42	3.87	Normal	Burst
4	0.42	2.97	Normal	Prolonged
7	0.42	2.97	Normal	Prolonged
10	0.42	2.97	Normal	Prolonged
13	0.42	2.97	Normal	Prolonged
16	0.42	2.97	Normal	Prolonged
19	0.42	2.97	Normal	Prolonged
22	0.42	2.97	Normal	Prolonged
25	0.42	2.97	Normal	Prolonged
28	0.42	2.97	Normal	Prolonged
31	0.42	2.97	Normal	Prolonged
34	0.42	2.97	Normal	Prolonged
37	0.43	2.91	Normal	Prolonged
40	0.44	2.81	M1	Prolonged
44	0.48	2.59	M1	Prolonged

Table 7. Gradually Varied Flow Specifications for 4.5 cfs.

	4.5 cfs
Normal Depth (ft)	0.42
Critical Depth (ft)	0.38
Headwater Depth (ft)	0.66
Inlet Velocity (ft/s)	3.87
Tailwater Depth (ft)	0.48
Burst Swim Time (s)	2.21
Prolonged Swim Time (m	2.23
Barrier Code	NONE

Barrier Codes

NONE - No Barrier

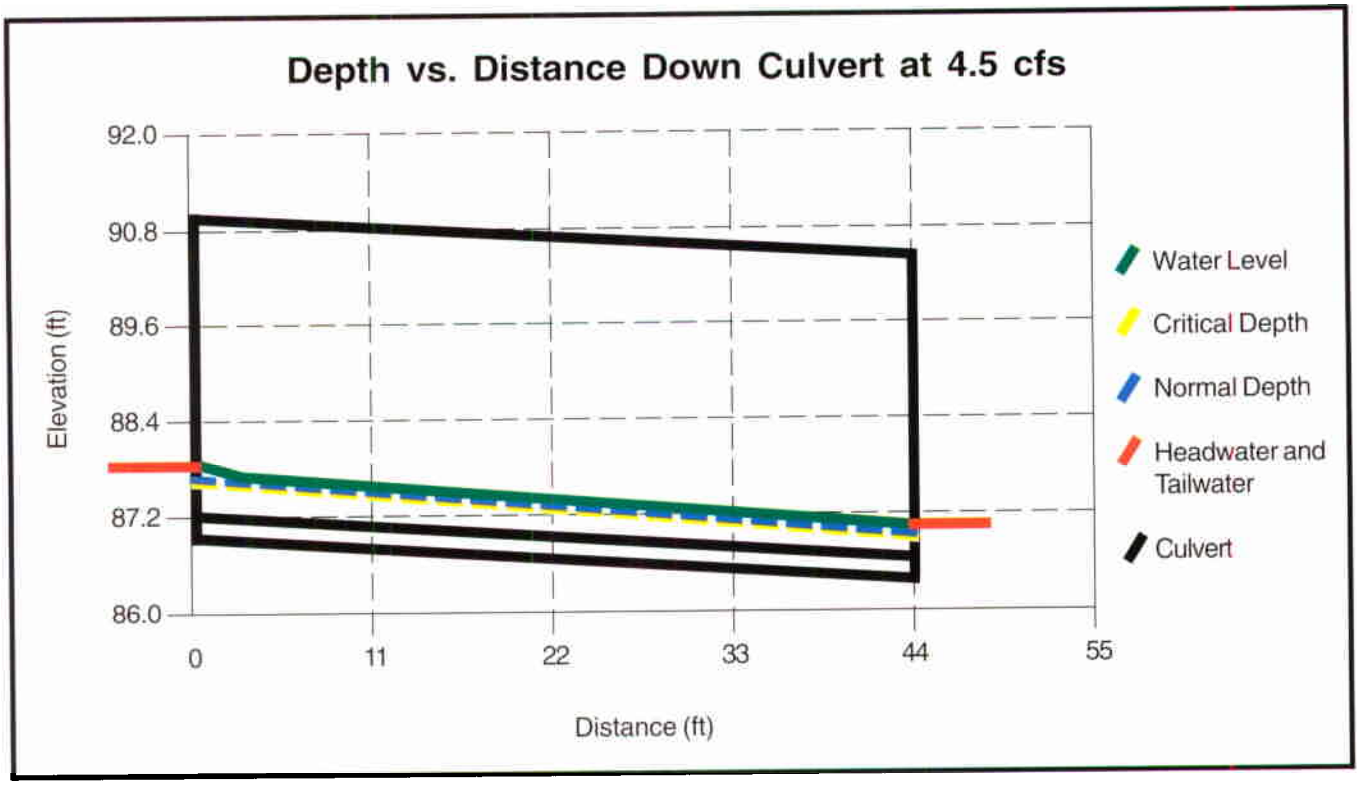


Figure 6. Water Surface Profile at 4.5 cfs.

<u>Tailwater Information</u>

Channel Bottom Slope: 4%
Outlet-Pool Bottom Elevation: 86.8 ft
Manning's Roughness Downstream of Tailwater: 0.045

Table 8. Tailwater Cross Section Data.

Obs. No.	Station (ft)	Elevation (ft)
1	0.00	87.30
2	3.75	86.80
3	7.15	86.80
4	10.90	87.30

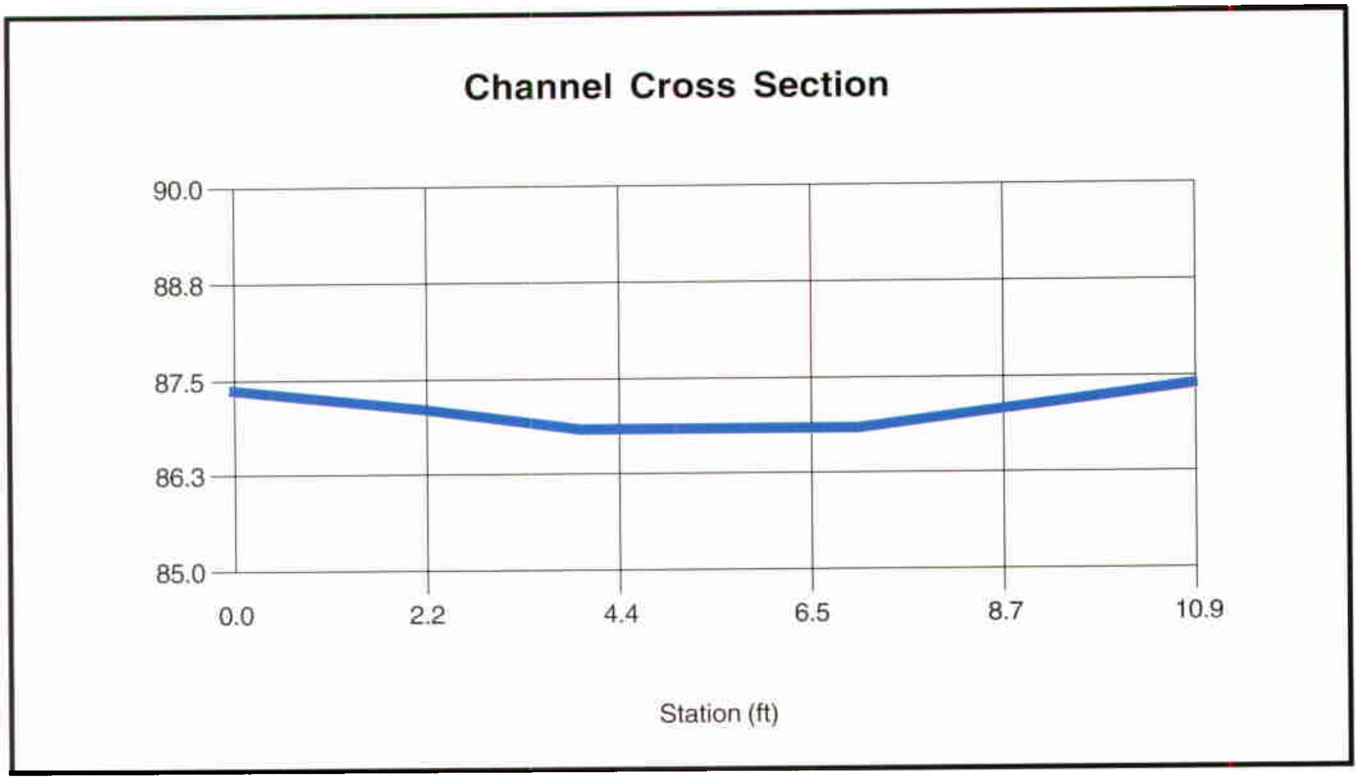


Figure 7. Channel Cross Section at Tailwater Crest.

Table 9. Tailwater Rating Table Information.

Discharge (cfs)	Tailwater Elevation (ft)	Wetted Perimeter (ft)	Cross-Sect. Area (sq. ft)
0.0	86.8	0.00	0.00
0.5	86.9	4.91	0.41
1.8	87.0	6.43	0.98
4.0	87.1	7.94	1.69
7.1	87.2	9.45	2.56
11.2	87.3	10.97	3.57

APPENDIX E

ROAD CONDITION SURVEY DATA

SUMMARY OF FISH STREAM CROSSING STRUCTURE BY DISTRICT

FEATURE	TRD	CRD	KRD	WRD	PRD	SRD	HRD	JRD	YRD	TOTAL
										0
Total Miles of System Road	1381	280	305	312	598	372	254	56	36	3594
Total Miles of System Road Surveyed	1154	173	2	107	522	71	59	35	30	2153
Total Miles of Non-system Road	517	107	51	172	261	124	53	16	0	1301
Total Miles of Non-system Road Surveyed	200	0	0	3	0	0	0	0	0	203
Number of Verified Fish Crossings(including pulled bridges) **[all fish]**	848	95		112	533	68	38	9	13	1716
Number of removed structures(both culverts and bridges) **[removed]**	66	3		1	5	0	0	1		76
Number of bridges **[bridges]**	62	2		16	83	17	6	1	2	189
Number of Verified AHMU 1 & 2 Culverts **[all culverts]**	249	89		95	441	51	32		11	968
AO Structural Plate Arch (open bottom, multi-plate)	1			0	17					18
AR Structural Plate Arch (closed bottom, multi-plate)	3	2		6	3	1				15
AR2 Double Structural Plate Arch (closed bottom, multi-plate)	0									0
AR3 Triple Structural Plate Arch (closed bottom, multi-plate)	0				2					2
CO Corrugated metal arch - open bottom	2			9						11
CP Corrugated metal pipe	645	81		73	338	47	30	6	10	1230
CP2 Double Corrugated metal pipe	0			2	22					24
CP3 Triple Corrugated metal pipe	0				5					5
CPB Corrugated metal pipe (baffled)	8									8
LC Log culvert	2									2
PA Corrugated metal pipe arch (squash pipe)	26			5	48	3	1	1	1	85
PA2 Double Corrugated metal pipe arch (squash pipe)	0				6					6
PP Plastic Pipe	17									17
WC Wooden culvert	4	6								10
Number of Verified Culverts with incomplete measurements **[missing data]**	268	54		56	87	8	1	4	11	489
Number of Verified Class I Culverts with incomplete measurements	79	16		22	17	8		3	11	156
Number of Verified Class II Culverts with incomplete measurements	189	38		34	70	0		1		332
Number of Verified Culverts with complete measurements **[fishpass]**	403	41		39	331	46	31	5	0	896
Number of Verified Class I Culverts with complete measurements **[verahmu1]**	126	9		4	87	35	8	4		273
Number of Green Class I	18	1		1	21	4	1	1		47
Number of Grey Class I	30	4		0	6	4	1	2		47
Number of Red Class I	78	4		3	60	27	6	1		179
Number of Verified Class II Culverts with complete measurements **[verahmu2]**	277	32		35	244	11	22	1		622
Number of Green Class II	19	3		1	13	0	0	0		36
Number of Grey Class II	41	2		0	10	1	0	1		55
Number of Red Class II	217	27		34	221	10	22	0		531
	0									0
Bridges (Class I)	50	2		8	52	12	2	1	2	129
Bridges (Class II)	12	0		8	31	5	4	0	0	60

SUMMARY OF WATER QUALITY RELATED DATA BY DISTRICT

FEATURE	TRD	CRD	KRD	WRD	PRD	SRD	HRD	JRD	YRD	TOTAL
Total Miles of System Road Surevyed	1154	173	2	107	522	71	59	35	30	2153
Cutslope Erosion (number of occurrences)	448	203		198	614	7	13	18		1501
Fillslope Erosion (number of occurrences)	46	61		32	90	2	7	2		240
Surface Erosion (number of occurrences)	225	26		8	375	9	22	10		675
Water Running Across Road (number of occurences)	115	26		146	107	24	1	3		422
Inlet Erosion on (number of occurences)	218	87		249	94	15	25	5		693
Outlet Erosion (number of occurences)	132	203		114	79	21	79	11		639
Ditch Erosion Locations (number of occurences)	21	12		5	20	3	2	1		64
Ditch Plugging Locations (number of occurences)	580	360		162	240	29	11	52		1434
Ditch Relief Culverts (number)	5400	1228		1269	4726	774	271	136	30	13834
Failure Mechanisms Recorded	2565	426		1766	1683	415	165	262		7282
Action Taken	681	161		144	547	42	66	44	3	1688

SUMMARY OF STRUCTURE TYPE BY DISTRICT

	TRD	CRD	KRD	WRD	PRD	SRD	HRD	JRD	YRD	TOTAL
MILES SURVEYED	1154	173	2	107	522	71	59	35	30	**2153**
CULVERT TYPE										**0**
AO	1				19					**20**
AR	5	3		8	5	1				**22**
AR2	0									**0**
AR3	0				2					**2**
CO	2			12	1					**15**
CP	9233	2577		1691	6873	1146	865	317	49	**22751**
CP2	2			2	40		4	2		**50**
CP3	0				15	3				**18**
CPB	13									**13**
LC	93	14			23					**130**
PA	33	9		9	64	9	11	8		**143**
PA2	0				18					**18**
PA3	0				3					**3**
PP	910	29								**939**
WC	34	57		1						**92**
TOTAL	**10326**	**2689**		**1723**	**7063**	**1159**	**880**	**327**	**49**	**24216**
BRIDGES										**0**
PB	43	8		10	32		10	4	1	**108**
MB	36			1	38	8	20		2	**105**
LB	17	4		18	63	37	4	3		**146**
TOTAL	96	12		29	133	45	34	7	3	**359**
FORDS	6									**6**
REMOVED STRUCTURES	267	20		66	226			1	2	**582**
MISSING STRUCTURES	629	272		133	104	66	2		1	**1207**
DITCH RELIEF CULVERTS	5400	1228		1269	4726	774	271	136	30	**13834**

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSI	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
PRD	6040	11.336	PA	82	126	42		40	0	20.0	0	0	MM_MM	5.37	7.45	5.4	0	N	O	7.35	7.0	7.4						1	-14.35	-14.35	-0.2	1.4	21.0	53		Y	
TRDS	3030000	14.570	CP	72	72	46	PRO	10	10	8.4	3	3	MM	4.9	8.89	5.2	100	CG	CG	9.18	4.8	4.8	12.8	13.22	22.0	12.2	26.6	1	-0.72	-1.12	0.6	0.8	13.1	72		Y	
TRDS	2050610	0.700	CP	60	60	40	PRO	5		8.3	3	3	MM1	5.0	9.30	4.2	50	LC	LG	9.40	5.0	5.1	14.2	14.40	8.5	13.2	11.2	1	0.00	-0.20	0.2	0.8	16.0	60		Y	
PRD	6407	6.725	CP	36	36	32	PRO	0	0	3.60	2	1	MM_NT	5.55	7.3	2.5	100	CG	CG	7.56	2.8	2.9	9.25	9.4	2.6	8.9	6.1	1	-0.96	-1.11	0.8	0.5	16.7	83		Y	
PRD	6415	9.263	PA	48	60	42	MIT	0	0	3.70	1	0	NT	4.95	9.04	4.5	100	FG	CG_FG	9.76	3.3	3.3	12.52	13.2	8.4	11.52	23	1	0.14	-0.54	1.7	-0.5	-12.5	135		Y	
JRD	8453	0.239	CP	48	48	45	PRO	0	0	3.8	2		MM	5	6.73	3.2	100	FG	FG	7	3.4	3.4	9.3					1	-10.40	-1.10	0.6	0.8	20.0	105		Y	
PRD	6324	0.079	PA	60	72	39	PRO	0	0	9.7	5	5	MM_MM	5.37	11	3.7	100	SC	SC	10.75	4.1	4.1	14.1	14.9	4.8	13	11.3	1	0.05	-0.75	-0.5	1.3	26.0	62		Y	
TRDN	2000000	123.830	CP	36	36	30		0	0	2.5	5	7	MM1	5.4	7.30	2.1	100	FG	FG	7.60	1.6	1.6	9.0	9.2	2.8	8.6	4.6	1	0.00	-0.20	1.0	0.9	30.0	120		Y	
TRDS	2054000	6.620	cp	60	60	40		0	0	7.6	7	2	hc_mm	5.0	8.30	3.3	100	sc_lc	lc_cg	8.95	3.6	3.6	12.3	12.60	9.3	12.7	11.7	1	0.05	-0.25	1.6	1.7	34.0	66		Y	
TRDS	3030000	9.210	CP	84	84	50	PRO	0		13.1	4	4	MM	4.9	8.46	7.2	100	SC	SC	9.02	7.9	8.5	16.1	16.70	10.8	14.2	24.6	1	-0.20	-0.82	1.1	-0.2	-2.1	53		Y	
TRDS	3030000	10.570	CP	96	96	50	PRO	0		9.8	5	2	MM	4.9	12.14	5.1	100	SC	LC	12.37	5.2	5.2	16.9	17.81	10.8	16.2	28.2	1	0.20	-0.72	0.5	2.9	36.5	81		Y	
TRDS	2054000	0.020	cpb	48	48	120	stb	0	0	10.7	1	4	pa_mm	5.0	21.30	3.9	100	cg	o_sc	27.35	3.5	3.5	30.8	31.00	4.1	30.7	5.4	1	0.15	-0.05	5.0	0.1	2.5	37		Y	
HRD	8530	3.230	CP	36	36	26	PRO	0	0	3.0	5	3	MM_MM	5	6.64	2.6	80	FG	S_FG	6.75	2.5	2.5	9.3	9.40	4.1	9.2	4.1	1	0.15	0.05	0.4	0.4	13.3	100		Y	
TRDN	2720000	0.292	CP	36	36	33		0	0	1.0	5	6	MM	6.0	7.20	2.0	80	CG	SC_CG	7.50	2.8	2.9	9.0	9.7	5.9	9.3	11.3	1	-0.60	-1.35	0.9	1.0	33.3	300		Y	
PRD	6415	6.825	PA	48	60	40	PRO	0	0	6.80	1	3	MM_MM	5.55	8.05	4	60	CG	CG	8.8	4.0	3.5	12.25	12.65	14	11.65	14.4	1	-0.15	-0.55	1.9	0.0	0.0	74		Y	
TRDS	3030100	1.300	CP	36	36	32	PRO	0		4.0	5	8	MM1	5.5	8.07	3.0	50	CG	CG	8.18	3.0	3.3	1091.0	11.11	3.5	10.5	16.2	1	-0.07	#####	0.3	0.0	0.0	75		Y	
TRDS	2054000	2.400	pa	76	110	42		0	0	6.9	4	3	pa_mm	5.0	6.95	6.4	40	s_fg	s_lc	7.10	6.2	6.3	13.2	13.80	8.3	9.6	12.6	1	0.50	-0.10	0.4	-0.1	-1.1	133		Y	
PRD	6031	3.891	PA1	66	90	52	MIT	0	0	12	6	6	MM_MM	5.37	10.5	5.7	40	S	SC	11	5.7	5.7	14.7	17	16.0	14.7	19.0	1	0.30	-2.00	1.1	-0.2	-3.6	63		Y	
JRD	8453	0.135	CP	24	23	38	PRO	0	0	2.2	1	1	MM	5	6.04	1.7	20	FG	S	6.12	1.7	1.8	7.8	8.1	3.4	7.6	4.4	1	0.28	-0.02	0.2	0.3	15.0	87		Y	
TRDN	2000000	124.600	CP	72	72	50		0	50	5.6	3	3	MM1	5.6	13.25	5.8	15	LC	CG	13.40	5.3	5.5	18.4	18.8	7.4	17.3	10.4	1	0.10	-0.30	0.3	0.2	3.3	107		Y	
TRDN	2000000	107.343	CP	60	60	76		0	0	9.7	7	8	HC2	5.6	22.30	4.7	10	SC	CG_LC	22.20	5.0	5.1	26.9	27.0	6.7	26.2	7.8	1	-0.20	-0.30	-0.1	0.3	6.0	52		Y	
TRDN	3000000B	86.286	CP	48	48	36		0	0	6.7	7	5	MC	5.8	8.35	3.6	10	CG_SC	LC_BO	8.40	4	4.45	11.7	12.2	8.3	11.4	11.2	1	-0.20	-0.70	0.1	0.4	10.0	60		Y	
TRDN	2000000	102.673	CP	72	72	42		0	0	9.2	2	2	MM1	5.6	7.48	5.5	10	CG_SC	CG_SC	7.81	3.7	3.7	10.3	11.5	22.0	9.7	NA	1	0.01	-1.12	0.8	0.5	8.3	65		Y	
TRDS	2050400	1.170	CP	108	108	50	PRO	0		14.6	3	1	MM1	5.5	8.55	9.0	10	CG	CG	9.30	8.8	8.9	15.5	16.40	12.8	15.9	14.0	1	-1.70	-2.60	1.5	0.0	0.0	62		Y	
TRDN	1500000	0.060	CP	36	36	30		0	0	5.4	2	1	ES	5.6	10.90	3.0	0		CG_FG	11.20	3.0	3.7	14.0	14.4	15.1	13.4	21.6	1	0.20	-0.20	1.0	0.0	0.0	56		Y	
TRDN	2000000	102.685	CP	36	36	40		0	0	3.0	1	1	MM1	5.6	7.77	2.9	0	NA	FS	8.14	3.0	3.0	9.7	11.4	10.1	9.3	NA	1	0.29	-1.43	0.9	0.1	3.3	100		Y	
TRDN	2000000	102.907	PA	63	87	36		0	0	8.4	5	4	MM1	5.6	7.11	5.2	0	NA	CG_SC	7.44	4.9	6.6	12.1	12.7	14.8	10.9	22.0	1	0.35	-0.28	0.9	0.0	1.0	86		Y	
TRDN	1525000	2.679	CP	89	128	58		0	0	13.5	2	2	MM1	5.7	14.30	7.8	0		LC	14.70	7.0	7.4	21.4	21.8	8.7	19.0	19.0	1	0.10	-0.30	0.7	-0.4	-5.2	79		Y	
TRDN	2000000	122.210	CP	96	96	64		0	0	13.6	5	3	MM1	5.6	14.80	8.0	0	NA	CG	14.90	8.0	8.2	21.2	22.1	18.3	20.5	20.3	1	-0.80	-1.70	0.2	0.0	0.0	59		Y	
TRDN	3000000B	84.046	CP	60	60	40		0	0	8.6	3	1	MM1	5.8	12.80	5.0	0		FG_SC	13.10	5.0	5.11	17.5	18.2	7.1	16.3	14.5	1	0.10	-0.60	0.7	0.0	0.0	58		Y	
TRDN	1445700	0.547	CP	72	72	40		0	5	10.4	2	1	MM1	5.4	9.00	5.9	0		B_SC	9.10	5.6	5.6	13.4	14.0	10.2	13.1	10.4	1	-0.70	-1.30	0.2	0.1	1.7	58		Y	
TRDS	3030000	15.570	CP	60	60	50	PRO	0			4	4	MM	4.9	11.84	4.9	0		CG	12.33	5.0	5.2	17.3	17.52	8.9	16.6	9.5	1	0.20	-0.07	1.0	0.1	2.3	####		Y	
TRDS	3030000	18.140	CP	72	72	50	PRO	0		4.2	2	3	MM	5.4	7.00	6.0	0	CG	LC	7.70	6.0	6.4	13.7	13.80	7.6	12.6	13.8	1	0.10	0.00	1.4	0.0	0.0	143		Y	
TRDS	2058000	2.040	CP	60	60	40	PRO	0		7.3	2	3	MM1	5.6	7.95	5.0	0		CG	8.00	5.1	5.2	12.0	12.20	9.0	11.7	10.3	1	-0.90	-1.10	0.1	0.0	0.0	68		Y	
TRDS	2054000	0.430	cp	60	60	58		0	0	na	1	1	pa	5.0	9.70	5.1	0		o	9.90	5.0	5.3	10.3	11.60	13.8	10.0	19.6	1	-3.30	-4.60	0.3	-0.1	-2.0	####		Y	
TRDS	2000000	76.935	CP	36	36	40		0	0	1.0	1	1	PA	5.8	8.40	3.0	0		O	9.50	3.0	3.4	12.4	12.10	0.5	12.4	1.7	1	-0.40	-0.10	2.8	0.0	0.0	300		Y	
TRDS	3000000	56.280	CP	18	18	40	PRO	0		2.6	1	2	PA1	5.4	10.92	1.5	0		O	10.79	1.5	2.1	11.6	12.60	4.6	11.6	4.6	1	0.30	-0.66	-0.3	0.0	-2.8	57		Y	
CRD	2014000	0.170	cp		48	33				4.1	2	4	mm	5	7.09	4.0	50	sc	sc_fg	6.86	4.0	4.0	10.8	11.1	2.5	10.27	4.8	1	0.20	-0.03	-0.7	-4.0	#####	98		Y	
CRD	2014000	0.190	cp		36	31				2.8	5	1	mm	5	8.73	3.0	30	fg	fg	8.92	2.9	3.0	11.8	12.0	2.1	11.15	3.4	1	0.15	-0.05	0.6	-3.0	#####	107		Y	
CRD	2150000	2.940	pa_ar	122	163	81	stb			22	3	3	mc	5	12.43	9.8	0		lc_bo	12.47	9.8	9.8	20.9	22.3	28.3	18.96	49.0	1	0.04	-1.34	0.0	0.4	3.6	62		Y	
CRD	2150000	3.140	cp	72	72	44				9	12	6	mc	5	8.20	6.0	0		lc_sc	8.73	6.0	6.4	14.1	14.6	8.4	13.62	12.9	1	-0.09	-0.65	1.2	0.0	0.0	67		Y	
PRD	6415	12.583	CP	36	36	34	PRO	0	0	5.40	0	0	PA_PA	4.95	6.72	3	60	S_O	S_O	6.7	2.6	2	7.18	8.68	3	6.8	18.7	1	-0.62	-2.12	-0.1	0.0	0.0	56	Y		
PRD	45001	0.640	PA	60	78	40	PRO	0	0	15.0	1	0	PA_PA	5.37	7.70	5.0	0	N	O	7.90	5.0	5.0	10.2	10.6	13.0	10.0	16.0	1	-2.30	-2.70	0.5	0.0	0.0	43	Y		
PRD	6415	10.194	CP	36	36	44	PRO	0	0	3.20	1	4	NT	4.95	13.2	2.7	100	CG_S	S	13.42	2.8	2.9	15.8	16.26	3.1	14.78	7.2	1	0.04	-0.42	0.5	0.3	10.0	94	Y		
PRD	6415	0.025	CP	36	36	30	PRO	0	0	2.40	1	3	MM_MM	5.55	7.15	2.3	100	0_CG	CG_FG	6.9	3.0	3.1	9.45	9.6	4.7	8.9	7.1	1	-0.30	-0.45	-0.8	0.7	23.3	125	Y		
PRD	6415	8.772	PA	72	84	46	MIT	0	0	6.60	2	2	MM_MM	4.95	8.06	5.4	100	CG	CG_SC	7.96	5.1	5.1	12.6	12.94	17.2	11.84	23.6	1	-0.12	-0.46	-0.2	0.6	10.0	106	Y		
PRD	6415	18.408	CP	36	36	38	PRO	0	0	2.20	2	1	MM_MM	4.95	10.8	2	100	ORG	CG	10.64	2.1	2.3	12.08	12.44	2.4	11.14	9.7	1	-0.30	-0.66	-0.3	1.0	33.3	136	Y		
PRD	6319	9.642	PA	36	54	42	PRO	0	0	6.6	3	1	MM_PA	5.37	9.35	2.8	100	CG	CG	9.8	2.3	2.3	10.5	11.4	10.8	9.3	20.0	1	-0.70	-1.60	1.1	0.2	6.7	68	Y		
PRD	6415	11.857	PA	60	84	44	MIT	0	0	5.00	2	0	PA_PA	4.95	8.46	4	100	CG	CG_SC	8.62	4.5	4.5	11.64	13.08	16.7	10.9	41.6	1	-0.04	-1.48	0.4	1.0	20.0	140	Y		
PRD	6241	0.373	CP	36	36	48	PRO	0	25	2.4	1	1	PA_PA	5.55	11.92	2.5	100	FG_O	O	6.86	1.9	1.9	8.23	10.80	6.6	8.10	10.3	1	2.04	-0.53	-10.5	0.5	16.7	125	Y		
PRD	6415	11.426	PA	78	96	38	MIT	0	0	9.50	0	1	PA_PA	4.95	7.46	6.6	100	S_O	S	7.58	6.5	6.5	11.04	16.4	7.3	10.28	8.4	1	2.32	-3.04	0.3	-0.1	-1.5	84	Y		
SRD	7540	1.277	CP	18	18	36	PRO	0	0	4	0	3	PA_PA	5	6.92	1.5	100	S	S_FG	6.9	1.2	1.2	7.9	8.1	3.7	7.8	5	1	0.00	-0.20	-0.1	0.0	0.0	38	Y		
TRDN	2000000	104.273	CO	144	144	78		0	0	4.0	8	6	HC	5.6	12.40	8.5	100	B_BO	B_BO	18.00	6.3	6.4	23.9	24.1	8.6	22.8	14.3	1	-0.20	-0.40	7.2	3.5	29.2	300	Y		
TRDN	2000000	120.968	CP	24	24	30		0	0	NA	1	1	PA5	5.6	6.75	1.7	100	S	S	8.00	2.0	2.0	8.4	NA	NA	NA	NA	1	######	-1.60	4.2	0.3	15.0	####	Y		
TRDN	2000000	120.981	CP	24	24	30		0	0	4.0	1	1	PA5	5.6	6.80	1.6	100	FG	O	7.40	1.9	1.8	7.5	NA	NA	NA	NA	1	######	-1.80	2.0	0.4	20.0	50	Y		
PRD	6415	17.699	CP	60	60	48	PRO	0	0	5.90	4	3	MM_MM	4.95	11.2	5	80	CS	CG	11.26	4.1	4.1	14.62	14.84	3.7	13.72	12	1	-0.52	-0.74	0.0	0.0	0.0	85	Y		
PRD	6415	11.042	CP2	48	48	40	PRO	0	0	3.60	2	4	MM_MM	4.95	6.78	4	75	CG_SC	CG	6.8	4.0	4.2	10.1	10.3	18.6	9.76	22	1	-0.50	-0.70	0.0	0.0	0.0	111	Y		
PRD	6040	13.297	AR	116	156	48	PRO	0	0	1.9	2	2	MM_MM	5.37	8.52	9.6	50	LG	LG	8.50	8.6	8.7	15.28	15.9	19.4	13.9	31.0	1	-1.18	-1.82	0.0	0.1	0.7	684	Y		
PRD	6415	11.043	CP2	48	48	40	PRO	0	0	3.60	2	4	MM_MM	4.95	6.8	3.9	50	CG	CG	6.8	4.0	4.5	10.1	10.3	18.6	9.76	22	1	-0.50	-0.70	0.0	0.1	2.5	111	Y		
HRD	8580	4.077	CP	48	48	33	PRO	0	0	2.4	1	1	PA_PA	5	8.13	4	30	FG	FG	8.41	3.7	3.6	11.9	12.20	4.5	11.8	5.6	1	0.09	-0.21	0.8	0.0	0.0	167	Y		
TRDN	2700000	0.743	PA	84	120	48		0	0	12.5	6	3	HC	5.0	8.20	7.4	30	BO	B	8.45	6.7	7.2	14.6	15.2	16.5	13.8	19.0	1	0.05	-0.55	0.5	-0.4	-5.7	80	Y		
TRDN	2000000	115.171	CP	120	120	52		0	0	13.5	4	5	MC2	5.6	9.60	7.6	15	LC	LC	9.75	8.4	8.5	15.9	17.7	22.0	15.2	28.0	1	-0.45	-2.25	0.3	2.4	24.0	74	Y		

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
TRDN	3000000B	85.612	CP	60	60	30		0	0	5.6	2	1	PA	5.80	7.18	5.0	10	O	O	7.10	4.9	60	10.2	11.4	10.4	9.7	NA	1	-0.60	-1.80	-0.3	0.0	0.0	89	Y		
WRD	6265	4.432	pa	114	180	47	stb	0	0	21	4	4	mc	4.75	8.2	9.6	10	cg	bo	8.2	9.7	9.9	17.6	18.1	21.8	16.8	22	1	0.20	-0.30	0.0	-0.1	-1.1	71	Y		
PRD	6235	17.703	CP	48	48	36		0	0	3.8	1	1	NT_PA	5.55	7.15	4.0	0	N	S	7.40	4.1	4.5	11.10	13.80	7.0	9.20	17.0	1	2.30	-0.40	0.7	0.0	0.0	105	Y		
CRD	2100000	5.710	cp	36	36	36		0		n/a	0	1	pa	5	6.89	2.0	0		o	7.02	3.0	3.2	10.2	10.3	2.7	9.61	6.9	1	0.28	0.15	0.4	1.0	33.3	####	Y		
JRD	8453	0.093	CP	24	24	37	PRO	0	0	2	3	2	MM	5	6.19	2	0		S	6.15	2	1.9	7.2	7.5	2.8	7.1	4.3	1	-0.65	-0.95	-0.1	0.0	0.0	100	Y		
PRD	6435	1.331	CP	48	48	48	PRO	0	0	5.3	5	5	HC_MM	5.30	12.3	4	0	N	LC_LG	12.51	4.0	4.3	15.36	15.96	6.9	15.17	9	1	-0.55	-1.15	0.4	0.0	0.0	75	Y		
PRD	6402	13.187	CP	24	24	32	PRO	0	0	1.00	4	0	MM_PA	5.55	7.18	2	0	N	CG	7.6	1.9	2.1	8.78	9.76	5.9	8.42	12.7	1	0.26	-0.72	1.3	0.0	0.0	200	Y		
PRD	6402	13.258	CP2	48	48	40	PRO	0	0	8.40	4	2	MM_PA	5.55	7.66	4	0	N	CG	7.14	4.0	4.4	10.48	11.52	6.4	11.2	14.3	1	0.38	-0.66	-1.3	0.0	0.0	48	Y		
PRD	6235	17.341	CP3	48	48	36	PRO	0	0	6.8	0	0	PA_PA	5.55	7.15	4.0	0	N	S_O	8.00	4.0	4.0	8.50					1	-12.00	-3.50	2.4	0.0	0.0	59	Y		
PRD	6235	17.347	CP3	48	48	36	PRO	0	0	6.8	0	0	PA_PA	5.55	7.95	4.3	0	N	S_O	8.50	4.2	4.3	8.50					1	-12.70	-4.20	1.5	-0.3	-7.5	59	Y		
PRD	45001	0.610	CP	36	36	30	PRO	0	0	2.3	4	1	PA_PA	5.37	7.30	2.3	0	N	S	7.70	2.3	2.3	10.1	10.6	3.8	9.8	4.1	1	0.60	0.10	1.3	0.7	23.3	130	Y		
SRD	7544	2.392	CP	18	18	22	pro	0	0	22	0.1		pa	5	6.35	1.55	0	n		6.2	1.5	8.19	7.8	8.32	15	7.55	15	1	0.62	0.10	-0.7	-0.1	-3.3	7	Y		
TRDN	1530000	0.418	CP	72	72	48		0	0	7.5	5	2	MC1	0.0	3.40	6.0	0		SC	3.60	6.0	6.5	9.1	9.4	18.0	8.0	19.0	1	-0.20	-0.50	0.4	0.0	0.0	80	Y		
TRDN	3070000	0.010	CP	48	48	36		0	0	5.3	3	2	MM	5.7	9.10	4.0	0		S	9.10	4.0	3.9	11.4	11.7	4.2	10.2	4.2	1	-1.40	-1.70	0.0	0.0	0.0	75	Y		
TRDN	2085000	1.552	CP	36	36	34		0	0	2.0	2	1	PA1	5.7	7.60	3.0	0		O	7.70	3.0	3.5	10.8	11.2	3.1	10.5	5.6	1	0.50	0.10	0.3	0.0	0.0	150	Y		
TRDN	2000000	113.804	CP	36	36			0	0	7.0	1	1	PA1	5.6	8.05	3.0	0	NA	O	8.70	3.0	3.3	9.2	11.1	10.5	8.3	14.0	1	-0.60	-2.50	####	0.0	0.0	43	Y		
TRDS	2054300	0.460	pa	67	95	40		0	0	na	1	1	pa	5.0	8.10	6.2	0		o	8.00	5.8	5.8	9.2	14.80	56.0	9.9	60.0	1	1.00	-4.60	-0.2	-0.6	-11.0	####	Y		
TRDN	3000000B	79.940	CP	24	24	40		O	40	3.6	1	1	PA1	5.6	8.10	2.4	0		O_SI	9.35	2	3.6	12.4	13.0	2.6	11.6	3.3	1	1.66	1.08	3.1	-0.4	-20.0	56			Y
PRD	6402	13.257	CP2	48	48	40	PRO	N	N	8.40	4	2	MM_PA	5.55	7.64	4	0	N	CG	6.92	4.0	4.8	10.48	11.52	6.4	10.2	14.3	1	0.60	-0.44	-1.8	0.0	0.0	48			Y
PRD	6415	10.455	PA2	60	84	40	MIT	100	0	6.30	0	1	PA_PA	4.95	7.1	5.1	100	ORG	ORG	7.06	5.1	5.2	10.12	9.5	10.8	9.32	15.9	1	-2.66	-2.04	-0.1	-0.1	-2.0	111			Y
PRD	6415	10.458	PA2	60	84	40	MIT	100	0	6.30	0	1	PA_PA	4.95	7.36	4.4	100	ORG	ORG	7	5.1	5.1	10.12	9.5	10.8	9.32	15.9	1	-2.60	-1.98	-0.9	0.6	12.0	111			Y
TRDN	3000000B	81.438	CP	48	48	50		100	100		0	0	ES	5.7	NA	4.0	100	LC_BO	O_LC				15.2					1	0.00	15.24	####	0.0	0.0	####			Y
SRD	7624	0.106	CP	36	36	40		100	0	POND	0	2	FP	5	6.56	1.29	100	FS	FS	7.5	3	11	9.63	11	14.4	9.92	15.1	1	0.50	-0.87	2.4	1.7	57.0	####			Y
TRDN	1505300	0.215	CP	60	60	44		90	0	NA	1	1	PA5	5.60	9.90	1.8	100	O	O	10.00	5.1	5.3	13.4	NA	NA	11.0	24.9	1	######	-1.70	0.2	3.2	64.0	####			Y
WRD	6590	26.858	AR	70	90	39		85	10	31	1	1	PA	4.75	8.10	5.8	60	S_CG	S_CG	9.75	5.2	5.3	20.15	20.65	5.1	19.05	10.5	1	5.70	5.20	4.2	0.0	0.6	24			Y
TRDS	2000000	76.978	CP	60	60	56		80	0	NA	0	0	PA	5.8	7.00	4.0	5	O	O	7.70	1.3	NA	NA	NA	NA	NA	NA	1	######	#####	1.3	1.0	20.0	####			Y
TRDS	3000000	58.860	CP	24	24	32	PRO	80	10	2.0	4	1	PA1	5.4	10.92	1.0			O	12.66	1.3	1.3	11.5	0.00	0.0	0.0	0.0	1	-13.97	-2.43	5.4	1.0	52.4	102			Y
TRDS	3015600	2.890	CP	36	36	40	PRO	80	0	8.1	3	2	MM1	5.5	6.50	1.3	100	CG_SC	CG_SC	7.60	0.8	NA	NA	NA	NA	NA	NA	1	######	#####	2.8	1.7	56.7	37			Y
TRDN	1445000	3.123	CP	72	72	40		70	0	NA	0	1	PA5	5.4	8.30	2.7	0		0	8.30	5.9	5.9	NA	NA	NA	NA	NA	1	######	#####	0.0	3.3	55.0	####			Y
SRD	7500	7.506	CP	60	60	32	PRO	60	0	12	3	2	AF	5	6.25	1.78	100	SC	SC	6.95	1.7	1.75	8.35	8.7	40	EE NOTE	40	1	0.05	-0.30	2.2	3.2	64.4	42			Y
CRD	2013100	0.010	cp		18			50		2	30	8	hc	5	9.55	1.6	0		sc	10.86	1.5	4.0	13.6	13.6	4.5	13.25	8.1	1	1.26	1.26	####	-1.6	#####	75			Y
PRD	6235	17.334	CP3	36	36	44	PRO	50	0	6.8	0	0	PA_PA	5.55	7.80	1.7	0	N	S_O	8.65	3.0	3.2	8.50					1	-11.65	-3.15	1.9	1.3	43.3	44			Y
TRDS	3000000	48.610	CP	18	18	25	PRO	50	30	1.6	1	2	PA5	5.4	6.63	1.0	80	SC	SC	6.92	1.0	1.1	8.3	8.33	2.6	8.0	4.9	1	0.36	0.33	1.2	0.5	34.4	91			Y
PRD	6402	13.202	CP	36	36	32	PRO	35	0	2.80	3	1	MM_PA	5.55	7.12	1.9	100	CG	CG	7.2	1.8	1.9	8.48	8.89	3.16	8.14	12.1	1	-0.11	-0.52	0.3	1.1	36.7	107			Y
TRDN	3000000B	86.646	CP	72	72			30	0	15.5	4	4	MM	5.8	13.90	4.5	10	SC_O	LC_BO	14.10	6	6.25	16.3	18.9	16.3	17.1	25.4	1	-1.20	-3.85	####	1.5	25.0	39			Y
PRD	6420	0.783	CP	60	60	80	PRO	25	15	5	8	6	HC_MM	5.30	29.4	3.8	95	LG_SC	SC	29.6	4.7	4.7	33.3	33.4	6.7	32.64	7.8	1	-0.90	-1.00	0.3	1.2	24.0	100			Y
SRD	7544	1.634	CP	24	24	26	pro	25	25	5.3	0.5	2	fp	5	8.1	1.4	0	0	or	7.1	1.4	8.6	8.55	8.8	5.3	8.63	6	1	0.30	0.05	-3.8	0.6	30.0	38			Y
TRDN	1530000	2.249	CPA	83	128	50		20	0	19.0	3	3	MM1	6.1	11.90	7.0	0		SC_BO	11.60	7.2	7.4	18.4	19.0	30.0	17.7	30.0	1	0.20	-0.40	-0.6	-0.1	-1.2	56			Y
PRD	6415	8.762	CP	48	48	40	PRO	15	0	3.20	1	2	MM_MM	4.95	9.46	4	40	LC_CG	FG	9.88	4.0	4.1	13.96	14.1	2.8	13.24	7.1	1	0.22	0.08	1.1	0.0	0.0	125			Y
PRD	6420	2.087	CP	48	48	40		15	0	6	5	6	MM_MM	5.30	10.3	3.1	100	LG_SC	LG_SC	11.02	4.0	4.3	14.1	14.46	8.2	13.48	9.7	1	-0.56	-0.92	1.8	0.9	22.5	67			Y
PRD	6314	2.176	CP	36	36	48	PRO	10	0	1.5	7	6	NT_NT	5.37	10.36	3.0	0	N	LG_O	13.28	3.0	3.2	16.08	16.1	2.2	15.9	5.3	1	-0.14	-0.20	6.1	0.0	0.0	200			Y
TRDS	3030000	8.310	CP	48	48	35	PRO	10	10	7.5	3	2		5.4	0.00	3.5		SC	CG	7.51	3.4	3.4	10.8	0.00	0.0	10.3	4.9	1	-10.89	-0.13	21.5	0.5	13.1	53			Y
TRDS	3000000	47.630	CP	48	48	30	PRO	10		4.3	4	3	MM1	5.4	7.54	4.1	5	SC	CG	8.00	3.7	3.4	12.2	12.82	4.9	11.2	8.2	1	1.15	0.52	1.5	-0.1	-2.5	94			Y
TRDN	2085000	3.147	CP	36	36	44		5	0	2.5	5	6	AF1	5.7	8.90	3.0	20	SC	LC	9.40	3.0	3.5	12.6	12.9	3.4	12.0	8.1	1	0.50	0.20	1.1	0.0	0.0	120			Y
SRD	7624	0.712	CP	48	48	36	PRO	2	0		2	2	MC	5	6.6	4.1	0	0	SG	7.29	4	12.3	11.7	12.25	10.9	11.68	11.2	1	0.96	0.41	1.9	-0.1	-2.5	####			Y
TRDS	2050300	0.060	CP	36	36	40	PRO	0		4.5	6	3	MM1	5.6	6.10	3.0	100	SC	SC	6.75	2.3	2.4	8.4	8.70	4.0	7.8	12.0	1	-0.35	-0.65	1.6	0.0	0.0	67			Y
TRDS	3000000	48.560	CP	36	36	30	PRO	0		4.3	1	2	PA5	5.4	6.86	3.6	100	CG	SC	7.22	2.6	2.7	8.9	8.92	9.8	8.8	14.8	1	-0.92	-0.98	1.2	-0.6	-19.2	70			Y
TRDS	3015600	1.170	CP	48	48	40	PRO	0	0	8.2	3	3	MM1	5.5	7.20	2.7	100	CG_SC	CG_SC	7.30	3.3	3.4	10.4	10.50	7.6	10.0	12.0	1	-0.10	-0.20	0.2	1.3	32.5	49			Y
SRD	7500	7.469	CP	36	36	32	PRO	0	0	2	4	2	AF	5	7.95	1.65	100	SC	SC_LC	7.85	1.74	2.35	8.7	10.2	8.7	8.3	40	1	0.61	-0.89	-0.3	1.4	45.0	150			Y
HRD	8502	0.996	CP	72	72	52	PRO	0	0	8.0	3	2	MM_MM	5	10.5	5.4	100	FG	FG_S	11.64	4.7	4.7	17.5	16.30	7.2	15.6	9.6	1	-0.04	1.16	2.2	0.6	10.0	75			Y
PRD	6407	2.534	PA2	77	53	64	MIT	0	0	10.40	3	2	MM_MM	5.55	9.24	5.3	95	SC	CG_SC	9.26	5.2	5.2	13.3	13.5	25.2	12.86	30.1	1	-0.96	-1.16	0.0	1.1	17.4	42			Y
PRD	6407	2.537	PA2	77	53	62	MIT	0	0	10.40	3	2	MM_MM	5.55	9.18	5.2	90	SC	CG_SC	9.02	5.3	5.4	13.3	13.5	25.2	12.86	30.1	1	-0.82	-1.02	-0.3	1.2	19.0	42			Y
TRDS	3030000	13.150	CP	36	36	40	PRO	0		3.6	2	1	MM	4.9	8.04	2.8	80	O	O	8.66	2.7	2.7	9.7	11.15	3.6	9.9	4.3	1	-0.20	-1.64	1.6	0.2	7.1	83			Y
TRDN	1530000	0.468	CP	72	72	48		0	0	13.0	4	3	MC1	0.0	3.50	5.7	75	SC	SC_CG	3.80	6.0	6.2	9.1	9.5	11.0	8.1	13.0	1	-0.30	-0.70	0.6	0.3	5.0	46			Y
PRD	6415	15.299	PA	72	84	44	MIT	0	0	8.00	2	1	MM_NT	4.95	8.18	5.8	70	CG_SC	CG	8.14	5.5	5.5	12.92	14.16	8.8	11.7	29.3	1	0.52	-0.72	-0.1	0.2	3.3	88			Y
PRD	6402	16.013	CP	36	36	42	PRO	0	0	3.5	5	7	MM_MM	5.30	8.16	3	35	CG	CG	9.46	3.0	3.3	12.4	12.7	3.7	12.3	4.8	1	0.24	-0.06	3.1	0.0	0.0	86			Y
HRD	8580	4.519	CP	36	36	40		0	0	1.9	3	1	MM_ES	5	7.41	3.2	30	S	S	8.05	2.8	2.8	10.4	11.10	3.5	10.1	3.9	1	0.25	-0.45	1.6	-0.2	-6.7	158			Y
TRDN	2000000	107.391	CP	60	60	62		0	0	6.9	10	NA	HC2	5.6	11.40	2.5	30	LC	B_LC	17.20	4.6	4.6	21.6	21.8	6.1	21.4	7.9	1	0.00	-0.20	9.4	2.5	50.0	72			Y
PRD	40000	4.972	CP	60	60	30	MIT	0	0	13.0	0	1	NT	5.55	8.16	5.5	25	S	S	7.93	5.5	5.5	12.10	13.50	11.7	10.90	12.9	1	0.07	-1.33	-0.8	-0.5	-10.0	38			Y
TRDN	1446000	0.325	CP	70	96	59	MIT	0	0	13.8	19	2	HC2	5.40	12.00	5.7	20	LC	B_BO	13.50	5.3	5.3	18.4	18.8	14.0	17.6	25.0	1	0.00	-0.40	2.5	0.1	2.3	58			Y
TRDS	2300000	1.900	CP	36	36	36	PRO	0		2.3	10	10	MM1	5.4	8.00	3.0	5	SC	SC	9.54	2.6	2.6	11.9	11.97	2.6	11.6	3.0	1	-0.13	-0.23	4.3	0.0	1.6	131			Y
PRD	6307	0.149	CP	24	24	35	PRO	0	0	3.8	9	2	HC_ES	5.37	8.55	2.0	0	N	SC	10.70	2.0	2.2						1	-12.70	-12.70	6.1	0.0	0.0	53			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WS	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
JRD	8453	0.173	PA	30	40	39	PRO	0	0	4.8	6			5	7.25	2.5	0		FG	7.79	2.6	2.5	9.7	10.1	5.3	9.3	6.3	1	-0.29	-0.69	1.4	0.0	0.0	69			Y
PRD	45001	0.185	CP	36	36	50	PRO	0	0	2.3	6	3	HC_MM	5.37	11.75	3.0	0	N	CG	14.60	3.0	3.6	17.4	17.8	1.6	17.2	3.1	1	0.20	-0.20	5.7	0.0	0.0	130			Y
PRD	6416	0.137	CP	48	48	52		0	0	5	3	3	MM_MM	5.30	11.74	4.1	0	N	LG	12.58	4.1	4.6	15.68	15.82	9.5	14.26	10.3	1	-0.86	-1.00	1.6	-0.1	-2.5	80			Y
PRD	6420	2.103	PA	72	96	40		0	0	15	5	6	MM_MM	5.30	6.9	6.7	0	0	SC	8.62	6.6	7.5	14.54	14.88	22	14.1	24	1	-0.34	-0.68	4.3	-0.7	-11.7	53			Y
PRD	6402	13.291	CP	48	48	30	PRO	0	0	4.00	2	1	PA5_PA5	5.55	6.32	3.9	0	N	CG	6.86	4.0	4.2	10.6	11.02	3.9	10.06	11.2	1	0.16	-0.26	1.8	0.1	2.5	100			Y
SRD	7500	7.869	CP	48	48	34	PRO	0	0	SWAMP	1	1	AF	5	5.7	3.3	0		O	6.09	4.11	4.16	8.4	10.25	SWAMP	SWAMP	SWAMP	1	0.05	-1.80	1.1	0.7	17.5	####			Y
SRD	7546	2.786	CP	24	24	30	PRO	0	0	3	11	4	MM	5	6.15	1.8	0		FG	7.7	2	2.3	9.5	9.7	4.5	8.9	6	1	0.00	-0.20	5.2	0.2	10.0	67			Y
SRD	7546	4.439	CP	18	18	38	PRO	0	0	3	5	8	N	5	6	1.7	0		O	8.1	1.8	7	NA	NA				1	######	#####	5.5	-0.2	-13.3	50			Y
TRDN	2000000	102.944	CP	36	36	42		0	0	1.5	3	3	HC	5.7	8.05	3.2	0	NA	CG_S	8.48	2.9	3.0	11.2	11.5	4.9	10.7	7.5	1	0.07	-0.19	1.0	-0.2	-6.7	200			Y
TRDN	2000000	89.035	CP	48	48	80		0	0	4.0	15	11	HC	5.8	13.00	7.0	0			15.20	7	6.6	19.7	20.5	10.0	19.8	18.0	1	-1.70	-2.50	2.8	-3.0	-75.0	100			Y
TRDN	3000000B	87.325	CP	48	48	50		0	0	6.1	3	2	MC	5.8	10.00	4.0	0		CG	12.10	4.0	4.45	15.6	15.6	6.5	14.2	12.2	1	-0.50	-0.50	4.2	0.0	0.0	66			Y
TRDN	2700000	5.623	CP	24	24	34		0	0	3.6	3	8	MC1	6.0	8.00	2.1	0		O_FG	8.85	2.0	2.1	10.6	10.9	4.0	10.3	6.6	1	0.05	-0.25	2.5	-0.1	-5.0	56			Y
TRDS	2000000	72.499	CP	96	96	86		0	0	7.6	11	3	HC	5.8	15.10	8.0	0		BO	18.20	8.0	8.2	26.0	26.40	14.7	24.2	24.9	1	0.20	-0.20	3.6	0.0	0.0	105			Y
TRDS	3000000	45.930	CP	24	24	40	PRO	0		2.3	3	3	MC1	5.4	10.56	2.0	0		SC	14.92	2.0	3.3	13.3	13.51	3.9	12.8	6.9	1	-3.38	-3.61	10.9	0.0	1.6	87			Y
TRDS	2054000	3.560	cp	36	36	32		0	0	2.4	3	3	mm	5.0	6.70	2.9	0		cg	7.20	3.0	3.2	10.4	10.50	3.4	10.2	14.6	1	0.30	0.20	1.6	0.1	3.3	125			Y
TRDS	3030000	11.150	CP	48	48	47	PRO	0		3.9	7	5	MM	5.7	9.35	4.2	0		CG	11.64	3.9	3.9	15.3	15.58	3.6	15.1	6.6	1	0.07	-0.26	4.9	-0.2	-4.1	102			Y
TRDS	3030000	13.990	CP	60	60	60	PRO	0	10	3.9	4	2	MM	4.9	4.89	4.9	0		SC	8.69	5.0	5.2	12.8	13.05	9.5	12.6	10.5	1	-0.62	-0.89	6.3	0.1	1.6	127			Y
TRDS	3030000	16.200	CP	84	84	50	PRO	0		7.2	5	4	MM	5.4	8.70	7.0	0		SC	10.00	7.0	86.0	16.6	16.70	12.3	14.9	21.4	1	-0.30	-0.40	2.6	0.0	0.0	97			Y
TRDS	3000000	48.670	CP	18	18	30	PRO	0		1.3	1	1	MM1	5.4	6.43	1.5	0		SC	7.15	1.5	1.5	8.1	8.20	2.0	7.9	3.9	1	-0.43	-0.49	2.4	0.0	1.6	114			Y
TRDS	2300000	3.840	CP	48	48	60	PRO	0		3.6	2	5	MM1	5.4	15.51	3.9	0		O	16.50	3.0	3.1	19.1	19.45	3.9	19.0	4.3	1	0.00	-0.36	1.6	0.1	1.6	111			Y
TRDS	2050400	0.560	CP	48	48	41	PRO	0		6.9	7	2	MM	5.6	8.40	4.1	0		SC	8.95	4.0	4.1	12.3	12.70	5.9	11.9	11.7	1	-0.25	-0.65	1.3	-0.1	-2.5	58			Y
PRD	6350	5.183	CP	18	18	40	PRO	0	0	3.6	1	2	MM_MM	4.95	8.94	1.5	0	N	FG	8.74	1.5	1.6	10.12	10.22	3.7	9.20	12.2	1	-0.02	-0.12	-0.5	0.0	0.0	42			Y
SRD	7500	7.710	CP	48	72	34		0	0	85	1	1	AF	5	6.49	4.56	0		O	6.49	5.11	5.16	9.69	11.65	12	9	65	1	0.05	-1.91	0.0	-0.6	-14.0	7			Y
TRDN	1500000	0.581	CP	60	60	32		0	0	18.0	1	1	ES	5.6	8.40	5.1	0		FG_CG	8.55	5.2	5.7	NA	NA	NA	NA	NA	1	######	#####	0.5	-0.1	-2.0	28			Y
TRDN	2700000	5.673	CP	36	36	36		0	0	14.0	7	3	HC2	6.0	8.00	3.2	0		B_LC	8.10	3.0	3.2	10.3	10.8	5.8	9.5	16.6	1	-0.35	-0.80	0.3	-0.2	-6.7	21			Y
TRDN	3000000B	80.785	CP	60	60	51		0	0	10.5	6		MM1	5.8	10.65	4.9	0		CG_SC	11.60	5	5.2	15.7	15.9	14.0	14.7	16.0	1	-0.70	-0.90	1.9	0.1	2.0	48			Y
TRDN	1430310	0.013	CP	62	78	42		0	0	14.5	1	2	MM1	5.40	9.90	5.1	0		CG_FG	9.50	5.2	5.7	14.9	14.6	9.9	14.1	11.5	1	-0.10	0.20	-1.0	0.1	1.3	45			Y
TRDN	1445000	3.190	PA	59	81	47		0	10	18.0	1	2	MM1	5.4	10.20	4.8	0		S_SC	10.40	5.2	5.4	14.9	15.8	32.0	14.5	32.0	1	0.20	-0.70	0.4	0.1	2.4	38			Y
TRDN	2900000	9.075	CP	18	18			0	0	4.8	2	1	MM1	5.6	7.50	1.5	0		O_CG	7.55	1.5	2.1	9.0	9.3	3.8	8.8	11.1	1	0.25	-0.05	####	0.0	0.0	31			Y
TRDN	3000000B	93.920	PA	96	144	40		0	0	25.0	1	1		5.8	7.60	8	0	N	SC	7.40	8	15.5	12.8	15.5	25.0	11.8	26.0	1	0.10	-2.60	-0.5	0.0	0.0	48			Y
PRD	6415	8.932	PA	53	65	36	PRO	0	0	7.50	1	3	AF_AF	4.95	6.8	4.5	0	N	CG_SC	7.5	4.3	4.7	11.94	12.38	5.1	10.86	14.3	1	0.58	0.14	1.9	-0.1	-1.9	72			Y
PRD	6204	8.002	CP	60	60	42	PRO	0	0	6.2	1	1	FP_FP	5.55	9.22	5.0	0	N	S	9.10	5.0	6.1	14.24	15.34	2.7	13.92	9.7	1	1.24	0.14	-0.3	0.0	0.0	81			Y
PRD	6314	4.283	CP	36	36	48	PRO	0	10	3.5	3	7	HC_HC	5.37	12.20	3.0	0	N	SC	12.70	3.0	3.6	15.98	16.4	3.5	15.6	5.8	1	0.72	0.28	1.0	0.0	0.0	86			Y
PRD	6031	2.958	CP	36	36	36	PRO	0	0	2.7	5	2	MM_MM	5.37	10.8	3	0	N	CG	11.15	3	3.2	14.3	15	3.4	13.6	5.8	1	0.85	0.15	1.0	0.0	0.0	111			Y
PRD	6404	3.339	CP	48	48	38	PRO	0	0	2.5	3	0	MM_PA	5.37	6.7	3.8	0.0	N	SC	6.72	4.1	4.9	10.98	12.54	9.8	11	11.5	1	1.72	0.16	0.1	0.2	5.0	160			Y
SRD	7500	7.801	CP	48	48	32	PRO	0	0	SWAMP	1	1	AF	5	6.9	3.35	0		O	6.95	3.15	3.25	10.42	13.3	SWAMP	SWAMP	SWAMP	1	3.20	0.32	0.2	0.7	16.3	####			Y
TRDN	1400000	7.052	CP	72	72	55		0	0	6.9	4	3	MC1	5.40	9.20	6.0	0		CG_SC	10.10	6.0	6.7	15.9	16.7	11.2	15.6	12.8	1	0.60	-0.20	1.6	0.0	0.0	87			Y
TRDN	2000000	83.710	CP	96	96	48		0	35	12.0	3	3	MM	5.8	13.50	7.7	0	0	12	12.80	8	8.5	19.0	21.3	22.7	18.9	23.7	1	0.50	-1.80	-1.5	0.3	3.8	67			Y
TRDN	1525000	3.403	CP	89	128	62		0	0	11.5	4	3	MM1	5.7	14.20	7.7	0		LC	14.40	7.0	7.9	21.7	22.6	11.0	20.3	25.0	1	1.20	0.30	0.3	-0.3	-3.8	93			Y
TRDN	1430310	0.705	CP	36	36	31		0	0	3.7	2	1	MM1	5.40	6.90	3.0	0		SC_O	7.00	3.0	3.4	10.3	10.6	5.4	9.8	6.1	1	0.60	0.30	0.3	0.0	0.0	81			Y
TRDS	2054000	3.780	cp	36	36	38		0	0	3.0	4	3	mm	5.0	8.50	2.8	0		o_cg	8.50	3.0	3.8	11.6	11.90	3.2	11.0	6.9	1	0.40	0.10	0.0	0.2	6.7	100			Y
TRDS	3030100	0.750	CP	60	60	36	PRO	0	15	4.0	3	1	PA4	5.7	6.80	5.3	0		O	6.50	5.1	5.1	10.2	12.00	8.9	9.9	9.0	1	0.40	-1.40	-0.8	-0.3	-6.0	125			Y
TRDS	3030000	13.750	CP	60	60	40	PRO	0		9.8	3	3	MM	4.9	5.08	0.0			O	9.12	4.9	5.1	13.1	13.64	7.5	13.1	8.5	1	-0.39	-0.95	10.1	5.0	100.0	51			Y
SRD	7546	1.184	CP	36	36	34	PRO	0	0	9	18	8	LC	5	6.55	2.2	30_50	CG	CG	9.1	1.7	1.8	10.5	10.8	7.6	10	14	1	0.00	-0.30	7.5	0.8	26.7	33			Y
HRD	8530	3.023	CP	36	36	32	PRO	0	0	6.1	3		MM_MM	5	8.97	2.7	100	FG_SC	S_FG	12.38	2.2	2.3	14.3	14.50	12.9	13.7	13.1	1	-0.08	-0.28	10.7	0.3	10.0	49			Y
PRD	6032	0.042	PA	60	84	41	MIT	0	0	8.8	8	9	HC_MM	5.37	7.75	3.8	100	CG	CG	8.7	4.3	4.3	15.1	15.5	8.1	14.4	12.6	1	2.50	2.10	2.3	1.2	24.0	80			Y
PRD	6032	0.756	PA	60	84	54	MIT	0	0	9.4	8	9	HC_MM	5.37	11.8	5	100	CG	CG	12.85	3.2	3.2	18.8	19.1	17.0	17.9	21.0	1	3.05	2.75	2.0	0.0	0.0	74			Y
PRD	6032	0.235	PA	48	60	40	MIT	0	0	7.4	7	8	MM_MM	5.37	8.3	3.8	100	CG	CG	8.85	4	4	13.5	13.9	8.8	13	15.0	1	1.05	0.65	1.4	0.2	5.0	68			Y
PRD	6032	0.569	PA	60	84	52	MIT	0	0	6.8	5	3	MM_MM	5.37	11.3	5.7	100	SC	CG	12.95	5	5	19.7	19.8	11.6	19.2	21.8	1	1.85	1.75	3.2	-0.7	-14.0	103			Y
TRDN	1446000	0.054	CP	60	60	61		0	0	3.0	1	4	MM1	5.40	13.80	4.5	90	SC	SC_LC	14.00	5.0	5.0	19.4	19.5	24.0	18.1	28.0	1	0.50	0.40	0.3	0.5	10.0	167			Y
PRD	6030	5.163	PA	44	72	40	PRO	0	0	12.3	3	2	MM_MM	5.37	10.85	3.4	50	SC	SC	10.30	4.0	4.7	14.4	14.9	10.7	14.0	14.2	1	0.60	0.10	-1.4	0.3	7.3	49			Y
TRDN	3000000B	88.208	CP	72	72	50		0	0	15.8	6	7	HC2	5.8	15.50	6.0	50	LC	BO_LC	16.60	5.3	5.35	20.4	20.6	17.7	20.4	18.3	1	-1.25	-1.45	2.2	0.0	0.0	38			Y
TRDN	2000000	123.946	CP	36	36	60		0	0	NA	13	2	PA5	5.4	14.20	2.4	50	CG	O	13.90	2.1	2.3	16.5	17.3	4.5	16.2	6.1	1	1.30	0.50	-0.5	0.6	20.0	####			Y
TRDS	2050300	0.870	CP	48	48	62	PRO	0		6.5	9	6	HC2	5.6	14.60	3.9	50	LC	LC	16.40	3.0	3.1	19.3	19.70	3.0	18.8	7.0	1	0.30	-0.10	2.9	0.1	2.5	62			Y
TRDS	3000000	46.200	CP	36	36	40	PRO	0	10	2.6	14	15	MC1	5.4	10.86	2.6	40	LC	B	10.66	3.0	4.6	14.9	15.09	4.3	15.0	6.2	1	1.44	1.28	-0.5	0.4	12.5	114			Y
SRD	7546	6.031	CP	24	24	30	PRO	0	999	4	11	8	MC	5	5.6	1.6	30	CG	CG	6.6	4	3.5	9.6	11.2	4	9.4	6	1	0.60	-1.00	3.3	0.4	20.0	50			Y
TRDN	2700000	0.710	CP	48	48	40		0	0	7.1	8	2	MM	5.0	6.50	3.6	25	LC	LC	6.50	4.0	5.3	11.5	12.0	6.2	10.4	9.4	1	1.50	1.00	0.0	0.4	10.0	56			Y
TRDN	2000000	125.430	CP	36	36	40		0	0	2.5	3	1	MM1	5.6	7.60	3.0	20	FG	CG	9.20	2.2	2.1	11.5	12.0	3.4	10.6	4.8	1	0.60	0.10	4.0	0.0	0.0	120			Y
TRDS	3000000	48.020	CP	24	24	44	PRO	0		1.6	20	10	HC2	5.4	11.35	2.1	10	LC	SC	11.91	1.6	1.6	13.8	13.84	5.6	13.1	8.5	1	0.36	0.30	1.3	-0.1	-6.6	122			Y
PRD	6235	17.227	CP	24	24	30	PRO	0	0	1.9	2	4		5.55	8.60	1.7	5	FG	S	8.70	2.0	2.8	11.30	11.50	2.2	10.85	5.0	1	0.80	0.60	0.3	0.3	15.0	105			Y
HRD	8582	0.114	CP	36	36	32	PRO	0	0	3.5	1	1	FP_FP	5	6.71	2.5	0		FG	9.09	2.3	1.9	11.6	11.90	7.8	11.4	8.3	1	0.51	0.21	7.4	0.5	16.7	86			Y
HRD	8580	9.838	PA	64	83	34	PRO	0	0	8.0	4	5	MM_MM	5	6.06	5.3	0		CG	6.26	5.3	5.8	12.6	12.90	12	12.1	14.7	1	1.34	1.04	0.6	0.0	0.6	86			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WS	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
PRD	6326	4.170	CP	36	36	41	PRO	0	0	6.3	8	9	HC_HC	5.37	12.00	3.0	0	N	LC	14.05	2.2	2.2	15.8	16.4	6.2	15.8	7.5	1	0.15	-0.45	5.0	0.0	0.0	48			Y
PRD	6333	0.062	CP	18	18	40	PRO	0	0	4.5	10	6	HC_HC	5.37	11.85	1.5	0	0	SC	13.85	1.5	2.4	14.9	15.5	2.4	14.5	6.6	1	0.15	-0.45	5.0	0.0	0.0	33			Y
PRD	45001	0.485	CP	36	36	44	PRO	0	0	2.1	7	5	HC_MM	5.37	7.10	3.0	0	N	CG_FG	8.70	3.0	3.3	11.8	12.1	3.4	11.5	4.4	1	0.40	0.10	3.6	0.0	0.0	143			Y
PRD	6031	3.833	CP	36	36	36	PRO	0	0	6.4	5	5	MM_MM	5.37	9.1	3	0	N	SC	10.3	3	3.2	12.6	13.4	4.9	12.6	5.6	1	0.10	-0.70	3.3	0.0	0.0	47			Y
PRD	6031	6.166	PA	60	84	42	PRO	0	0	5.3	2	3	MM_MM	5.37	9.45	5	0	N	O_FS	9.75	5	5.5	15.3	15.9	5.8	14.2	8.3	1	1.15	0.55	0.7	0.0	0.0	132			Y
PRD	6317	0.043	CP	36	36	60	PRO	0	0	4.5	4	4	MM_MM	5.37	13.54	3.0	0	N	SG	14.72	3.0	4.6	17.82	18.10	3.3	17.02	10.2	1	0.38	0.10	2.0	0.0	0.0	67			Y
PRD	6350	11.325	CP	48	48	35	PRO	0	0	6.5	4	4	MM_MM	4.95	6.96	4.1	0	N	SC_CG	8.34	4.0	4.8	12.66	13.10	6.3	12.20	19.8	1	0.76	0.32	3.9	-0.1	-2.5	62			Y
PRD	6416	0.767	CP	48	48	50	PRO	0	0	8.7	4	4	MM_MM	5.3	10.26	4	0	N	SC	11.48	4.0	5.23	14.86	14.94	16.9	14.3	19.8	1	-0.54	-0.62	2.4	0.0	0.0	46			Y
PRD	6430	0.607	PA	96	120	54	PRO	0	0	26	2	2	MM_MM	4.75	6.92	7.7	0	N	LC_CG	7.84	7.7	7.8	14.18	14.88	16.60	12.4	36.0	1	-0.66	-1.36	1.7	0.3	3.8	38			Y
PRD	45601	1.301	PA	54	66	48	PRO	0	0	4.0	2	2	MM_PA	5.37	10.15	4.3	0	N	CG	10.55	4.4	5.7	15.3	15.8	4.6	15.0	10.8	1	0.85	0.35	0.8	0.2	4.4	138			Y
PRD	6435	0.512	CP	36	36	36	PRO	0	5	4.5	4	4	N	5.30	6.86	3.2	0	0	SG	8.02	3.0	3.5	11.27	11.51	5.2	10.53	5.9	1	0.49	0.25	3.2	-0.2	-6.7	67			Y
PRD	6031	0.583	CP	24	24	40	PRO	0	5	2.3	2	2	PA_PA	5.37	9.25	2	0	N	O	9.4	1.8	2.3	11.7	11.9	0.9	11.5	6.0	1	0.70	0.50	0.4	0.0	0.0	87			Y
SRD	7546	6.625	CP	18	18	36	PRO	0	0	1.5	5	30	AF	5	6.4	1.5	0		O	9.4	1	1.2	10	11.5	2	10.9	3.5	1	1.10	-0.40	8.3	0.0	0.0	100			Y
SRD	7546	6.249	CP	36	36	40	PRO	0	0	4	20	10	LC	5	9.65	2.9	0		O	12.95	3	3.2	15.7	18.6	4	17.8	13	1	2.65	-0.25	8.3	0.1	3.3	75			Y
SRD	7546	4.841	CP	24	24	40	PRO	0	0	3	25	25	MC	5	6.25	1.8	0		CG	8.2	2	3	10.5	11.2	4	8.1	6	1	1.00	0.30	4.9	0.2	10.0	67			Y
SRD	7546	0.436	CP	18	18	32	PRO	0	0	3	6	6	MC	5	7.45	1.6	0		MS	8.99	1.6	3	11.4	NA	2	11.2	4	1	######	0.81	4.8	-0.1	-6.7	50			Y
SRD	7546	7.144	CP	18	18	30	PRO	0	0	2	7	25	MM	5	6.9	1.8	0		O	8.15	1.5	1.7	9.2	10.1	8	9.7	8.5	1	0.45	-0.45	4.2	-0.3	-20.0	75			Y
SRD	7540	106.845	CP	36	36	34	PRO	0	0	6	4	6	MM	5	7.9	2.9	0	N		8.69	3	3.56	11.62	12.3	7	11.2	9	1	0.61	-0.07	2.3	0.1	3.3	50			Y
TRDN	1445630	1.527	CP	24	24	27		0	0	6.2	3	2	ES	5.40	7.20	2.0	0	NA	O	7.80	2.0	2.6	9.5	9.8	2.9	8.9	8.9	1	0.00	-0.30	2.2	0.0	0.0	32			Y
TRDN	2000000	117.733	CP	84	84	92		0	0	7.0	10	12	HC3	0.0	15.40	7.3	0	NA	LC_BO	27.50	7.0	7.8	42.4	43.3	8.8	41.7	13.6	1	8.80	7.90	13.2	-0.3	-4.3	100			Y
TRDN	3060000	0.005	CP	36	36	52		0	0	3.5	3	5	MC1	5.7	11.80	3.1	0		LC_LG	13.70	3.2	3.5	17.0	17.3	6.8	16.7	10.1	1	0.40	0.10	3.7	-0.1	-3.3	86			Y
TRDN	2000000	125.414	CP	24	24	36		0	0	2.2	3	1	MM1	5.6	9.10	2.0	0	NA	FG	9.40	2.0	2.9	12.2	12.3	7.5	10.8	8.0	1	0.90	0.80	0.8	0.0	0.0	91			Y
TRDN	3000000B	80.709	CP	18	18	30		0	50	4.7	8	28	MM1	5.6	7.60	1.7	0		CG_SC	8.29	1.5	1.6			5.9		7.2	1	-9.79	-9.79	2.3	-0.2	-13.3	32			Y
TRDN	3000000B	93.211	CP	36	36	40		0	0	3.0	1	3	PA	5.8	8.70	3	0	N	O	8.80	3	12.4	12.6	13.5	6.0	11.6	10.0	1	1.70	0.80	0.3	0.0	0.0	100			Y
TRDS	2050400	0.160	CP	36	36	35	PRO	0		2.9	1	5	MM	5.6	6.95	3.0	0		CG	7.55	3.0	3.6	10.9	11.05	3.9	10.6	6.6	1	0.50	0.30	1.7	0.0	0.0	103			Y
TRDS	3030000	7.980	CP	24	24	36	PRO	0	30	4.3	4	4		4.9	6.36	1.9	0		CG	6.76	1.9	2.0	8.5	8.82	4.8	7.2	6.6	1	0.13	-0.16	1.1	0.1	4.9	47			Y
SRD	7546	6.897	AR	144	168	46	PRO	0	0	30	7	7	LC	5	8.5	9.5	100	LC	BO	10.4	7.2	7.2	16.6	19	22	15.5	30	1	1.40	-1.00	4.1	2.5	20.8	47			Y
TRDS	3030000	19.420	CP	93	93	70	PRO	0		22.0	3	3	MM	5.7	12.85	7.2	15	SC	LC	12.60	6.2	6.5	20.5	20.60	30.0	20.2	38.7	1	1.80	1.70	-0.4	0.6	7.1	35			Y
PRD	6350	11.351	CP	24	24	30	PRO	0	0	1.9	3	3	MM_MM	4.95	8.46	2.0	10	CG	CG	9.30	2.1	3.7	12.64	12.72	5.8	11.70	9.7	1	1.32	1.24	2.8	0.0	0.0	105			Y
HRD	8580	9.288	CP	48	48	34	PRO	0	0	4.5	3	4	MM_MM	5	5.66	4	0		FG	7.25	4	4.6	11.7	11.80	5.6	11.5	6.4	1	0.55	0.45	4.7	0.0	0.0	89			Y
PRD	6235	17.071	CP	48	48	36	PRO	0	0	5.2	3	1	AF_NT	5.55	6.90	4.2	0	N	CG	7.94	4.0	4.8	12.36	13.70	5.8	10.46	14.2	1	1.76	0.42	2.9	-0.2	-5.0	77			Y
PRD	6235	0.713	CP	36	36	34	PRO	0	0	3.2	19	7	HC_AF2	5.55	8.56	3.0	0	N	CG	10.54	3.0	4.1	15.00	15.60	1.8	13.80	7.2	1	2.06	1.46	5.8	0.0	0.0	94			Y
PRD	6319	10.571	CP	36	36	36	PRO	0	0	2.7	28	11	HC_HC	5.37	8.75	3	0	N	SC	9.95	3	6	14.4	14.8	4.2	13.8	6.5	1	1.85	1.45	3.3	0.0	0.0	111			Y
PRD	6434	2.568	CP	48	48	50	PRO	0	0	6.6	9	8	HC_HC	4.75	10.8	4	0	N	LC_SC	12.02	4.0	6.5	18.15	18.35	5.20	16.1	8.0	1	2.33	2.13	2.4	0.0	0.0	61			Y
PRD	6032	0.484	CP	60	60	70	PRO	0	0	5	16	7	HC_MM	5.37	17.5	5	0	N	CG	21.6	5	6.2	30.8	31.3	3.7	30.4	7.2	1	4.70	4.20	5.9	0.0	0.0	100			Y
PRD	6032	0.859	CP	60	60	81	PRO	0	0	8	7	5	HC_MM	5.37	19.3	5	0	N	LC_SC	22.65	5	5.7	31.4	31.6	8.5	30.5	15.0	1	3.95	3.75	4.1	0.0	0.0	63			Y
PRD	6350	15.318	CP	36	36	30	PRO	0	25	4.7	7	6	MM_MM	4.95	5.68	3.0	0	N	S_SC	6.54	2.9	6.6	11.48	11.96	4.4	9.82	11.1	1	2.52	2.04	2.9	0.0	0.0	64			Y
PRD	6415	2.836	CP2	48	48	40	PRO	0	0	7.50	3	4	MM_MM	5.55	9.7	4.1	0	N	CG	10.35	4.2	5.5	15.5	15.65	6.7	14.05	8.7	1	1.10	0.95	1.6	-0.1	-2.5	53			Y
PRD	6235	15.450	CP	48	48	36	PRO	0	0	4.6	4	1	MM_NT	5.55	7.54	4.2	0	N	SC	8.65	4.1	5.3	13.57	14.30	4.7	11.70	10.3	1	1.55	0.82	3.1	-0.2	-5.0	87			Y
PRD	6032	0.133	CP	36	36	34	PRO	0	15	4.5	19	14	N_N	5.37	7.3	3	0	N	FG	8.65	3	3.9	14.6	14.7	3.7	14.2	6.2	1	3.05	2.95	4.0	0.0	0.0	67			Y
PRD	6031	0.597	CP	36	36	60	PRO	0	0	2.5	2	6	PA_MM	5.37	12.4	3	0	N	S	14.6	3	3.5	19.3	19.6	4.9	18.8	8.7	1	2.00	1.70	3.7	0.0	0.0	120			Y
PRD	6235	0.190	CP	24	24	40		0	0	4.7	1	1	PA_NT	5.55	7.86	2.4	0	N	S_O	8.20	2.0	4.5	12.64	14.30	2.4	11.00	8.1	1	4.10	2.44	0.8	-0.4	-20.0	43			Y
SRD	7546	7.366	PA	36	52	40	PRO	0	0	7	8	20	LC	5	9.4	3.4	0		CG	11.75	3.3	4.5	15.6	16.4	5	15.2	9.5	1	1.35	0.55	5.9	-0.4	-13.3	62			Y
SRD	7546	7.038	CP	18	18	36	PRO	0	0	7	5	8	M	5	6.45	1.5	0		O	6.5	1.9	1.5	9.6	10.2	4	9.4	5.5	1	1.80	1.20	0.1	0.0	0.0	21			Y
SRD	7546	6.329	CP	18	18	32	PRO	0	0	3	22	40	MC	5	9.6	1.4	0		O	12.85	1.5	2	14.9	16.6	3.5	15.9	5	1	2.25	0.55	10.2	0.1	6.7	50			Y
SRD	7540	106.827	CP	36	36	28	PRO	0	0	18	6	5	MC	5	7	2.57	0	N	SC	7.96	3	4	11.15	11.5	10.3	11	13	1	0.54	0.19	3.4	0.4	14.3	17			Y
SRD	7546	0.684	CP	18	18	28	PRO	0	0	4	10	10	MM	5	7.65	1.2	0		FS	9.2	1.6	2.3	11.1	11.3	4	9.9	6.5	1	0.50	0.30	5.5	0.3	20.0	38			Y
SRD	7546	4.388	CP	18	18	26	PRO	0	0	4	6	7	N	5	7.9	1.3	0		O	8.55	1.5	2.3	10.2	10.9	4.5	9.9	6.5	1	0.85	0.15	2.5	0.2	13.3	38			Y
SRD	7542	0.109	CP	24	24	34	PRO	0	0	4.4	1	1		5	9.05	2	0	N	FG_CG	10	2	12	11.9	12.7	4	11.45	6	1	0.70	-0.10	2.8	0.0	0.0	45			Y
TRDN	1470000	6.048	CP	60	60	60		0	0	8.6	6	3	ES3_MM1	5.40	8.80	6.3	0		LC	14.30	6.3	11.8	22.7	23.3	23.4	21.7	29.0	1	2.70	2.10	9.2	-1.3	-26.0	58			Y
TRDN	2700000	3.718	CP	36	36	38		0	0	6.0	9	5	HC	6.0	10.55	3.0	0		CG_SC	11.40	3.0	4.0	15.9	16.3	7.3	15.7	8.8	1	1.85	1.50	2.2	0.0	0.0	50			Y
TRDN	2000000	117.023	CP	72	72	70		0	0	10.0	9	9	HC2	5.4	14.10	6.0	0	NA	LC	16.80	6.0	7.6	24.6	25.0	5.3	23.1	24.8	1	2.20	1.80	3.9	0.0	0.0	60			Y
TRDN	3060000	0.660	CP	24	24	40		0	0	3.2	5	13	MC1	5.7	7.90	2.0	0		FG_SC	11.00	1.9	2.6	14.1	14.2	7.0	13.7	9.5	1	1.30	1.20	7.8	0.0	0.0	63			Y
TRDN	3000000B	81.621	CP	48	48	76		0	0	11.8	4	11	MC1	5.6	7.60	4.1	0		BR_LC	10.15	4	4.75	14.1	14.7	LC_BO	13.9	11.6	1	0.54	-0.02	3.4	0.0	-1.3	34			Y
TRDS	3015600	1.240	CP	36	36	40	PRO	0	0	2.1	15	6	HC2	5.6	6.30	3.1	0		CG_S	7.45	3.0	4.0	11.1	11.20	5.2	10.7	9.1	1	0.75	0.65	2.9	-0.1	-3.3	143			Y
TRDS	2000648	0.500	CP	24	24	30	PRO	0		1.2	4	7	MM	5.0	7.40	2.0	0		FG	8.70	2.0	2.4	10.9	11.10	1.0	10.6	3.3	1	0.40	0.20	4.3	0.0	0.0	167			Y
TRDS	3030000	11.220	CP	24	24	40	PRO	0		2.3	1	3	MM	5.7	7.54	1.9	0		O	8.20	2.0	2.2	10.5	10.63	4.6	10.0	8.5	1	0.46	0.36	1.6	0.1	4.9	87			Y
TRDS	3000000	47.870	CP	36	36	32	PRO	0		3.9	6	6	MM1	5.4	3.94	3.1	0		O	7.51	2.9	2.9	10.8	10.92	3.3	10.3	4.9	1	0.49	0.39	11.2	-0.1	-2.8	76			Y
TRDS	2058150	0.730	CP	36	36	40	PRO	0		3.5	2	5	MM1	5.6	12.10	2.7	0		O	12.85	2.9	3.2	16.5	16.60	3.0	16.0	4.6	1	0.85	0.75	1.9	0.3	10.0	86			Y
WRD	6590	17.168	CP	36	36	30		0	0	5.5	9	14	HC	4.00	5.75	3.0	0		SC	6.95	3.0	5.3	11.80	11.90	8.4	11.30	10.8	1	1.95	1.85	4.0	0.0	0.0	55			Y
WRD	6590	17.639	CP	48	48	60		0	999	16.4	7	4	HC_MM	5.00	14.80	3.5	0		SC_LC	16.60	4.0	4.6	20.80	21.10	6.1	23.30	18.7	1	0.50	0.20	3.0	0.5	12.5	24			Y
PRD	6235	15.846	CP2	48	48	34	PRO	0	0	10.4	1	2	FP_FP	5.55	7.50	4.4	0	N	CG	8.20	4.0	4.8	12.65	13.95	13.6	11.90	14.2	1	1.75	0.45	2.1	-0.4	-10.0	38			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
PRD	6031	6.631	CP	24	24	40	PRO	0	0	4.3	10	8	HC_HC	5.37	9.1	2	0	N	SC	10.25	2	3.6	13.8	15.2	3.3	13.8	4.8	1	2.95	1.55	2.9	0.0	0.0	47			Y
PRD	6031	3.161	CP	60	60	54	PRO	0	0	11.4	9	9	MC_MC	5.37	11.1	5	0	N	LC	12.85	5	6.1	19	20	10.8	19	11.4	1	2.15	1.15	3.3	0.0	0.0	44			Y
PRD	6031	5.840	CP	36	36	40	PRO	0	0	9.5	3	4	MM_MM	5.37	11.5	3	0	N	O	12.95	3	3.9	16.8	18.7	9.5	16.8	10.8	1	2.75	0.85	3.6	0.0	0.0	32			Y
SRD	7543	0.203	CP	48	48	50	PRO	0	0	13	2	2	MM	5	14.3	4	0			15		17.5	18.3	17.5	9	18.8	13	1	2.50	3.30	1.5	0.0	0.0	31			Y
TRDN	1400000	6.354	CP	18	18	40		0	0	3.3	4	5	MM1	5.40	10.90	1.5	0		FS_O	12.10	1.5	2.0	14.4	14.3	2.3	13.7	5.1	1	0.70	0.80	3.0	0.0	0.0	45			Y
TRDS	2300000	3.530	CP	40	40	60	PRO	0		8.5	3	80	MM1	5.4	15.19	4.1	0		CG	17.32	4.0	4.6	21.7	22.07	4.9	21.4	6.6	1	0.75	0.43	3.6	-0.8	-23.0	39			Y
CRD	2150000	3.200	cp	36	36	34				9	9	2	mm	5	7.97	2.5	0		lc_sc	8.20	2.9	2.9	11.0	11.2	6.3	10.53	6.9	1	0.12	-0.14	0.7	0.5	16.7	33			Y
TRDS	3000000	48.960	CP	18	18	30	PRO			2.0	1	1	PA1	5.4	7.58	1.5			O	8.76	1.1	1.1	8.9	9.41	2.6	8.5	3.9	1	-0.43	-0.92	3.9	0.0	1.6	76			Y
CRD	2013000	0.100	cp		48	33				6.5	33	11	hc	5	6.07	4.0	0		bo	9.09	4.0	5.7	17.6	17.7	6.1	16.67	10.0	1	4.63	4.46	9.2	-4.0	#####	62			Y
CRD	2013000	0.081	cp		60	40				5.9	16	14	hc_af	5	5.25	5.0	0		bo	7.51	5.0	7.6	15.1	15.2	4.6	14.34	16.0	1	2.68	2.55	5.7	-5.0	#####	85			Y
SRD	7542	0.027	PA	47	60	64	PRO	0	0	10	3	3	MC	5	7.4	3.7	O	N	SC_CG	8.1	3.9	12.6	12	11.4	22	10.2	26	1	-0.60	0.00	1.1	0.2	5.5	50		Y	
SRD	7500	7.455	CP	36	36	30	PRO	0	0	2	4	2	AF	5	6.7	2.3	100	SC	SC_LC	6.85	3.25	3.44	8.78	10.3	7.7	8.6	28	1	0.20	-1.32	0.5	0.7	23.3	150		Y	
TRDN	1445000	9.708	CP	60	60	40		0	0	5.2	3	3	MM1	5.4	7.90	4.7	100	SC	CG_SC	8.40	4.4	4.4	12.2	12.4	6.2	12.1	7.7	1	-0.40	-0.60	1.3	0.3	6.0	96		Y	
TRDS	2054000	1.175	cp	48	48	40		0	0	5.9	3	3	mc	5.0	8.10	3.4	100	cg_fg	cg	8.30	3.7	3.7	11.5	11.80	10.3	11.2	13.2	1	-0.20	-0.50	0.5	0.6	15.0	68		Y	
SRD	7540	8.054	CP	70	106	41	pro	0	0	16	3.5	4	mm	5	8.6	6	35	fs	fs	8.7	5.6	5.7	13.05	14	13.5	12.45	14.1	1	-0.30	-1.25	0.2	-0.2	-2.9	55		Y	
SRD	7500	8.073	CP	18	18	32	PRO	0	0	SWAMP	0.5	0.5	AF	5	6.4	1.6	0		O	6.55	2.04	2.25	8.05	8.8	SWAMP	SWAMP	SWAMP	1	0.21	-0.54	0.5	-0.1	-6.7	####		Y	
TRDS	2058000	1.610	CP	60	60	50	PRO	0		3.0	2	5	MM1	5.6	9.65	4.1	100	CG	CG	9.50	4.1	4.2	13.4	13.60	4.2	13.1	5.4	1	0.00	-0.20	-0.3	0.9	18.0	167	Y		
TRDS	3000000	56.820	CP	36	36	40	PRO	0		3.3	2	2	PA1	5.4	11.12	2.3	50	SC	O	10.86	3.0	3.0	13.2	13.71	5.2	12.9	5.2	1	-0.10	-0.59	-0.7	0.7	23.5	91	Y		
SRD	7500	8.470	CP	48	48	30	PRO	0	0	2	2	2	AF	5	6.55	2.7	5	S	S_O	6.3	3.06	3.1	8.95	9.4	7	8	9.6	1	0.04	-0.41	-0.8	1.3	32.5	200	Y		
SRD	7500	7.791	CP	48	72	32	PRO	0	0	SWAMP	1	1	AF	5	6.55	4.5	0		O	6.76	4.79	4.79	10.4	11.55	SWAMP	SWAMP	SWAMP	1	0.00	-1.15	0.7	-0.5	-12.5	####	Y		
TRDN	3000000B	84.181	CP	60	60	40		0	0	5.4	4	3	MM1	5.8	7.70	5.0	0		FG_SC	7.70	5.0	5.15	9.9	NA	NA	NA	NA	1	######	-2.80	0.0	0.0	0.0	93	Y		
TRDN	3000000B	85.462	CP	24	24	40		0	0	NA	1	2	PA	5.80	10.45	2.3	0		O	10.20	2.0	1.9	10.5	NA	NA	NA	NA	1	######	-1.70	-0.6	-0.3	-17.0	####	Y		
TRDS	3000000	57.730	CP	96	96	60	PRO	0		9.8	6	5	MC2	5.4	12.69	7.9	0		SC	12.96	7.9	8.4	18.5	19.71	21.3	18.3	26.2	1	-1.12	-2.36	0.4	0.1	1.6	81	Y		
TRDS	3000000	46.800	CP	24	24	30	PRO	0		2.6	1	1	MM1	5.4	6.69	2.1	0		O	6.10	2.1	2.4	7.9	8.10	3.0	9.9	6.6	1	-0.10	-0.26	-2.0	-0.1	-3.3	76	Y		
TRDS	2300000	1.410	CP	48	48	70	PRO	0		4.3	2	3	MM1	5.4	17.81	5.0	0		O	18.17	4.9	5.0	22.1	22.50	4.9	22.0	6.2	1	-0.56	-0.92	0.5	-1.0	-25.5	94	Y		
TRDN	2085000	2.649	CP	60	60	38		10	0	7.0	7	5	AF1	5.7	8.00	5.4	100	LC	LC_B	8.20	5.8	5.8	13.1	13.2	1.7	12.1	10.1	2	-0.80	-0.90	0.5	-0.4	-8.0	71		Y	N
TRDS	3030000	6.010	PA	72	87	44	PRO	10		13.1	25	10		5.4	7.97	4.9	100	LC	BO	8.40	4.8	4.9	12.3	13.12	14.8	11.3	18.0	2	-0.07	-0.92	1.0	1.1	19.1	55		Y	N
TRDN	2085000	1.856	CP	48	48	40		10	0	4.4	6	8	MM1	5.7	9.30	3.8	100	CG_LC	LC	9.60	3.5	3.9	12.8	13.2	6.3	12.3	9.9	2	0.10	-0.30	0.7	0.2	5.0	91		Y	N
TRDS	3030000	9.250	CP	72	72	40	PRO	5		8.5	4	2	MM	4.9	7.87	5.9	100	CG	CG	8.20	4.8	4.8	12.1	12.37	16.4	11.9	18.0	2	-0.62	-0.89	0.8	0.1	1.6	70		Y	N
TRDN	2085000	1.168	CP	48	48	40		5	0	6.2	6	NA	MM1	5.7	7.10	3.4	5	LC	CG_SC	7.10	4.0	4.0	9.6	9.6	NA	NA	NA	2	-1.50	-1.50	0.0	0.6	15.0	65		Y	N
PRD	6407	4.028	CP	60	66	46	MIT	0	0	3.70	10	3	MM_MM	5.55	8.28	5.3	100	LC	SC_B	8.96	5.0	5.2	13.48	13.9	4.8	13.04	13.2	2	-0.06	-0.48	1.5	-0.3	-6.0	149		Y	N
TRDN	2000000	120.277	CPB	60	60	55		0	0	5.0	14	11	HC1	5.6	12.85	4.0	100	SC	LC	13.10	5.2	5.3	18.0	18.6	4.6	17.3	9.6	2	0.30	-0.30	0.5	1.0	20.0	100		Y	N
TRDN	2000000	117.220	CP	60	60	70		0	75	6.0	9	14	HC2	0.0	14.10	2.3	100	CG	LC	15.30	4.8	5.0	17.6	18.2	4.8	17.3	7.8	2	-1.90	-2.50	1.7	2.7	54.0	83		Y	N
TRDN	2000000	129.222	CP	72	72	40		0	10	5.4	5	5	MC1	5.8	11.70	3.6	100	LC_B	LC_B	11.90	5.2	5.4	17.1	17.4	6.0	16.6	10.3	2	0.30	0.00	0.5	2.4	40.0	111		Y	N
TRDN	3000000B	87.695	CP	48	48	40		0	0	7.8	6	5	MC1	5.8	10.90	3.6	100	LC_CG	LC_CG	10.45	4.0	4.3	13.8	14.4	9.2	13.4	10.2	2	-0.05	-0.65	-1.1	0.4	10.0	51		Y	N
TRDN	1500000	12.589	CP	60	60	30		0	0	4.5	4	3	MM1	0.0	2.50	4.0	100	SC	SC	2.50	4.6	4.7	7.1	7.3	5.7	6.0	9.9	2	0.20	0.00	0.0	1.0	20.0	111		Y	N
TRDN	2000000	127.575	CP	48	48	46		0	0	4.5	2	1	MM1	5.80	8.10	3.6	100	ORG	SC_LC	8.40	3.4	3.3	11.1	11.4	3.7	10.7	4.9	2	-0.40	-0.70	0.7	0.4	10.0	89		Y	N
TRDS	2054000	2.030	cp	60	60	46		0	0	4.0	5	2	pa_mc	5.0	8.20	3.8	100	s_cg	cg	8.40	3.6	3.5	12.0	12.20	5.9	11.7	8.7	2	0.20	0.00	0.4	1.2	24.0	125		Y	N
TRDN	2900000	3.925	CP	36	36	40		0	0	3.0	8	3	HC2	5.6	8.80	2.0	50	LC	CG_SC	8.95	3.0	3.1	11.5	12.1	7.4	11.4	7.7	2	0.15	-0.45	0.4	1.0	33.3	100		Y	N
TRDN	2000000	82.677	CP	60	60	50		0	10	3.3	2		MM	5.8	13.50	4.9	50	O	SG	14.00	3.4	3.4	16.4	17.0	4.9	15.7	7.6	2	-0.40	-1.00	1.0	0.1	2.0	152		Y	N
TRDN	1500000	13.116	CPB	36	36	44		0	0	5.5	3	2	MM1	0.0	7.60	3.6	50	LC	SC	10.50	3.0	2.8	12.0	12.3	8.5	10.5	9.5	2	-1.20	-1.50	6.6	-0.6	-20.0	55		Y	N
TRDN	2085000	2.479	CP	36	36	40		0	0	4.9	6	6	AF1	5.7	8.00	2.6	25	SC	SC_CG	8.10	3.0	3.3	10.6	10.7	3.9	10.0	14.1	2	-0.40	-0.50	0.2	0.4	13.3	61		Y	N
TRDN	3000000B	92.615	CP	48	48	40		0	0	4.0	6	6	HC	5.8	12.75	3.5	10	LC	LC_SC	13.05	3.8	16.6	16.3	16.4	4.0	15.7	5.0	2	-0.45	-0.55	0.8	0.5	12.5	100		Y	N
TRDN	2085000	0.445	CP	36	36	44		0	0	5.3	2	2	MM1	5.7	13.90	3.0	5	CG	CG_SC	13.80	3.0	3.2	16.7	16.8	5.9	16.1	6.3	2	0.00	-0.10	-0.2	0.0	0.0	57		Y	N
PRD	6235	9.300	CP	72	72	60	MIT	0	0	5.5	2	5	MM_MM	4.95	13.83	6.0	0	N	SC	14.82	6.0	6.1	20.16	20.36	9.8	19.50	13.1	2	-0.46	-0.66	1.7	0.0	0.0	109		Y	N
TRDN	3000000B	89.109	CPB	48	48	80		0	0	3.1	8	7	HC2	5.8	15.50	3.9	0			21.30	4.0	4.2	25.2	25.8	4.2	24.8	4.6	2	0.50	-0.10	7.3	0.1	2.5	129		Y	N
TRDN	3000540	0.230	CP	60	60	52	PRO	0	0	5.2	3	3	MM	5.7	14.90	5.0	0		S	15.40	4.8	4.8	19.1	19.5	4.6	18.3	8.8	2	-0.70	-1.10	1.0	0.0	0.0	96		Y	N
TRDN	1470600	0.864	CP	48	48	40		0	0	7.0	7	2	MM1	5.4	13.10	3.8	0		FG_SC	13.00	4.0	4	15.7	16.2	7.9	14.9	14.9	2	-0.80	-1.30	-0.2	0.2	5.0	57		Y	N
TRDS	2054000	4.600	cp	84	84	58		0	0	11.8	10	7	hc	5.0	9.00	7.2	0		sc_lc	9.50	7.0	7.5	15.5	16.10	16.9	15.1	20.0	2	-0.40	-1.00	0.9	-0.2	-2.9	59		Y	N
TRDS	2050000	2.390	PP	36	36	40	PRO	0		2.0	9	6	MM	5.6	9.10	3.0	0		CG	9.30	2.9	2.9	12.0	12.05	6.0	11.6	10.2	2	-0.15	-0.25	0.5	0.0	0.0	150		Y	N
TRDS	3000000	56.220	CP	24	24	40	PRO	0		2.3	2	2	PA1	5.4	12.30	1.6	0		SC	12.69	1.8	2.0	14.2	14.37	2.3	14.1	4.3	2	-0.10	-0.26	1.0	0.4	21.3	87		Y	N
TRDS	3030000	7.500	CP	48	48	60	PRO	0		5.2	3	35		5.4	12.00	4.2			FS	12.56	4.2	0.0	0.0	0.00	0.0	0.0	0.0	2	-16.73	-16.73	0.9	-0.2	-4.1	76		Y	N
PRD	6407	6.493	CP	36	36	50	PRO	0	0	5.20	4	5	MM_MM	5.55	16.1	3	100	CG	CG	16.2	2.8	2.9	18.76	19.1	5.3	18.44	6.6	2	0.10	-0.24	0.3	0.0	0.0	58		Y	N
PRD	6030	9.223	CP	48	48	40	PRO	0	0	5.4	5	1	MC_MC	5.37	10.00	4.0	50	SC	SC	10.30	3.7	3.8	13.6	14.1	5.8	13.3	6.7	2	0.10	-0.40	0.8	0.0	0.0	74		Y	N
PRD	6402	11.813	CP	36	36	40	PRO	0	0	4.30	3	4	MM_MM	5.55	8.8	2.6	50	CG	CG	8.62	3.0	3.9	11.32	11.72	5.5	10.94	12.8	2	0.10	-0.30	-0.5	0.4	13.3	70		Y	N
TRDS	2059300	1.380	CP	48	48	44	PRO	0		6.8	4	9	MM1	5.7	18.30	4.1	20	CG	CG	8.60	3.7	3.8	11.4	11.80	6.6	11.0	9.3	2	-0.50	-0.90	-22.0	-0.1	-2.5	59		Y	N
TRDN	1430310	0.573	CP	36	36	40		0	0	2.7	1	3	MM1	5.40	6.50	3.0	10	SC	O	6.90	3.0	3.1	9.9	10.0	4.2	9.7	4.5	2	0.10	0.00	1.0	0.0	0.0	111		Y	N
JRD	8561	0.063	CP	36	36	34	PRO	0	0	3.8	1	3	FP_FP	5	6.65	3.2	0		S	6.98	3	3	9.6	10.1	6.3	9.1	11.3	2	0.12	-0.38	1.0	-0.2	-6.7	79		Y	N
PRD	6350	4.693	CP	24	24	52	PRO	0	5	2.9	3	3	MM_MM	4.95	9.56	1.8	0	N	CG	10.10	1.8	1.8	11.54	11.84	2.8	11.22	6.3	2	-0.06	-0.36	1.0	0.2	10.0	69		Y	N
PRD	6440	0.115	CP	36	36	36	PRO	0	0	4.2	1	2	MM_MM	4.75	6.76	3	0	N	CG	6.58	2.7	2.8	9.07	9.28	4.40	8.3	7.1	2	0.00	-0.21	-0.5	0.0	0.0	71		Y	N
TRDN	1400000	6.455	CP	48	48	41		0	0	6.2	2	2	MM1	5.40	7.20	4.0	0		FS_CG	7.10	4.0	4.4	11.0	11.4	6.9	10.6	7.8	2	0.30	-0.10	-0.2	0.0	0.0	65		Y	N
TRDN	3000000B	89.944	CP	60	60	70		0	0	4.9	7	10	HC2	5.8	19.90	4.5	0		SC_CG	20.70	4.6	4.6	25.2	25.4	2.6	25.0	2.9	2	0.10	-0.10	1.1	0.5	10.0	102		Y	N

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
TRDS	3000000	57.620	CP	24	24	30	PRO	0		3.3	3	4	HC2	5.4	7.64	2.0	0		O	7.97	2.0	2.0	9.3	9.87	2.6	9.3	2.6	2	-0.07	-0.66	1.1	0.0	1.6	61		Y	N
TRDS	2300000	4.090	CP	72	72	50	PRO	0		11.5	5	4	MC2	5.4	13.12	6.2	0		CG	13.61	5.9	6.0	18.8	19.25	5.6	18.4	8.5	2	-0.26	-0.75	1.0	-0.2	-2.8	52		Y	N
TRDS	2054000	5.330	cp	36	36	48		0	0	2.6	2	5	mm	5.0	10.35	2.8	0		fg_cg	10.80	3.0	3.1	13.6	14.00	3.8	13.4	4.7	2	0.20	-0.20	0.9	0.2	6.7	115		Y	N
TRDS	3015105	0.570	CP	24	24	30	PRO	0	0	2.2	3	4	MM1	5.0	6.10	2.4	0		SC_S	6.35	2.0	2.0	8.2	8.60	2.0	7.8	3.3	2	0.25	-0.15	0.8	-0.4	-20.0	91		Y	N
TRDN	2000000	123.767	CP	24	24	40		0	0	3.5	8	11	HC2	5.4	9.10	1.7	100	FG	CG	9.40	1.9	1.9	11.4	11.6	1.2	10.7	4.3	2	0.30	0.10	0.8	0.3	15.0	57		Y	N
TRDS	3000000	53.090	CP	60	60	45	PRO	0		9.8	15	10	HC2	5.4	10.69	3.0	100	LC	LC	11.02	4.6	4.9	15.6	15.94	5.6	15.0	7.2	2	0.33	-0.03	0.7	2.0	41.0	51		Y	N
TRDS	2050000	3.010	CP	36	36	30	PRO	0		3.4	5	2	MM	5.6	8.02	2.3	100	SC	CG	8.25	2.3	2.3	10.6	10.70	6.3	10.3	8.2	2	0.15	0.05	0.8	0.7	23.3	88		Y	N
TRDS	2050300	2.930	CP	60	60	45	PRO	0		7.6	7	4	MM1	5.6	10.20	4.3	100	SC	CG	10.73	4.7	4.7	15.1	15.50	9.8	14.6	12.7	2	0.07	-0.33	1.2	0.7	14.0	66		Y	N
PRD	6031	3.893	PA2	66	90	51	MIT	0	0	12	6	6	MM_MM	5.37	10.3	6	30	S	SC	10.95	6	6	14.7	17	16.0	14.7	19.0	2	0.05	-2.25	1.3	-0.5	-9.1	63		Y	N
PRD	6402	16.196	PA	60	72	42	MIT	0	0	11	4	4	MM_MM	5.30	12.6	5	0	N	LC	13.4	5.1	5.2	18.1	18.8	11	18	12.7	2	0.30	-0.40	1.9	0.0	0.0	55		Y	N
PRD	6407	3.176	CP	48	60	44	MIT	0	0	6.90	2	4	MM_MM	5.55	8.76	3.9	90	CG	CG	9.36	3.6	3.8	13.04	13.2	3.4	12.7	10.9	2	0.24	0.08	1.4	0.1	2.5	72		Y	N
CRD	2100000	18.130	cp	36	36	38				3.8	4	6	mm	5	8.30	2.0	100	cg_fg	cg_fg	8.46	2.8	2.9	10.9	10.9	2.3	10.30	5.5	2	-0.37	-0.37	0.4	1.0	33.3	79		Y	N
TRDS	2050610	0.370	PP	36	36	40	PRO			6.0	3	1	MM	5.0	8.95	3.0	0		CG	9.05	3.0	3.1	11.4	11.55	12.3	10.8	13.9	2	-0.50	-0.65	0.3	0.0	0.0	50		Y	N
CRD	2100000	18.960	cp	48	48	40				8	8	5	hc	5	7.22	3.0	100	fg_cg	lc	7.74	2.5	2.6	8.1	8.0	5.7	9.94	13.6	2	-2.24	-2.17	1.3	1.0	25.0	50		Y	N
PRD	6423	0.071	CP	48	48	40	PRO	10	0	2	1	1	PA_PA	5.37	6.74	3.7	0	N	ORG	7.1	4	4.2	10.92	11.04	3.6	10.44	6.9	2	-0.06	-0.18	0.9	0.3	7.5	200	Y		N
PRD	6415	16.615	CP	48	48	34	PRO	0	0	5.70	1	0	PA_PA	4.95	9.02	3.6	100	ORG	S_ORG	9.48	3.7	3.5	10.68	13.96	6	10.16	20.4	2	0.78	-2.50	1.4	0.4	10.0	70	Y		N
PRD	46437	0.051	CP	36	36	40	PRO	0	0	2.5	3	1	MC_MM	5.37	11.4	2.3	100	LG	LG	10.88	3	2.9	13.18	14.08	5	12.24	6	2	0.20	-0.70	-1.4	0.7	23.3	120	Y		N
PRD	6407	7.708	CP	60	60	48	PRO	0	0	6.70	4	1	MM_MM	5.55	10.5	5	100	CG_SC	CG	10.68	4.6	4.8	15.35	15.5	5.4	15.06	6.7	2	0.22	0.07	0.3	0.0	0.0	75	Y		N
PRD	6415	9.893	PA	60	84	35	MIT	0	0	4.50	2	6	MM_MM	4.95	6.64	5.8	100	CG	CG	6.66	4.4	4.4	10.54	10.84	13.5	10.26	19.6	2	-0.22	-0.52	0.1	-0.8	-16.0	156	Y		N
PRD	6030	3.658	PA	48	72	36	PRO	0	0	7.6	2	0	MM_PA	5.37	7.45	3.8	100	FG	FS	7.30	3.1	3.2	10.2	12.4	2.8	9.6	5.9	2	2.00	-0.20	-0.4	0.2	5.0	79	Y		N
WRD	6265	2.427	co	36	72	33		0	0	5	6	8	mm	4.75	5.65	3	100	sc	s_cg	7	3	2.85	10	10.4	4.2	9.6	5.1	2	0.40	0.00	4.1	0.0	0.0	120	Y		N
TRDS	2300000	1.170	CP	36	36	40	PRO	0		3.6	1	1	PA5	5.4	10.10	3.0	20	O	O	10.99	2.7	2.7	0.0	0.00	0.0	0.0	0.0	2	-13.71	-13.71	2.2	0.0	1.6	83	Y		N
TRDN	2000000	85.884	CP	48	48	50		0	0	2.0	3	2	PA	5.8	9.00	3.3	10	SC/B	SC	9.30	4	4.3	13.1	13.5	6.6	13.8	14.5	2	0.20	-0.20	0.6	0.7	17.5	200	Y		N
TRDN	2079000	5.107	CP	96	96	65		0	0	10.2	4	5	MC2	5.5	14.00	8.0	5	CG	BO_SC	14.50	7.9	7.7	20.6	21.2	20.4	20.5	28.3	2	-1.20	-1.80	0.8	0.0	0.0	78	Y		N
PRD	6030	3.365	CP	36	36	36	PRO	0	0	2.6	3	5	MM_MM	5.37	10.15	3.0	0	N	FG	10.15	3.0	3.2	12.7	13.0	3.0	12.2	5.7	2	-0.15	-0.45	0.0	0.0	0.0	115	Y		N
PRD	6402	8.273	CP	36	36	44	PRO	0	0	3.60	3	5	MM_MM	4.95	6.5	3	0	N	FG	6.54	3.0	3.2	9.26	9.4	3.5	8.66	4.4	2	-0.14	-0.28	0.1	0.0	0.0	83	Y		N
PRD	6030	1.006	CP	48	48	60	PRO	0	0	6.2	2	1	MM_PA	5.37	13.35	4.0	0	N	O	13.30	4.0	4.0	15	18.7	9.0	15.0	10.4	2	1.40	-2.30	-0.1	0.0	0.0	65	Y		N
PRD	6030	4.085	CP	72	72	36	PRO	0	0	12.4	1	0	PA_PA	5.37	7.15	6.0	0	N	O	7.40	6.0	6.3	10.9	12.1		10.9		2	-1.30	-2.50	0.7	0.0	0.0	48	Y		N
PRD	6030	10.382	CP	48	48	40	PRO	0	0	8.5	1	1	PA_PA	5.37	10.45	4.0	0	N	CS	10.75	4.0	4.5	13.3	14.4	8.7	12.9	12.6	2	-0.35	-1.45	0.8	0.0	0.0	47	Y		N
PRD	6402	17.041	CP	24	24	34	PRO	0	0	4.8	2	6	PA_PA	5.30	9	2	0	CG	O	10.1	2.0	2.2	12.1	12.5	5.4	12	6	2	0.40	0.00	3.2	0.0	0.0	42	Y		N
PRD	6441	0.126	CP	18	18	28	PRO	0	0	6.5	0	0	PA_PA	4.75	5.54	1.5	0	N	O	6.24	1.5	3.0	6.16	9.20	8.30	6.1	26.0	2	1.46	-1.58	2.5	0.0	0.0	23	Y		N
TRDN	1480000	4.180	CP	48	48	36		0	0	5.2	2	6	MC1	5.40	9.00	4.0	0		CG_FG	9.00	3.9	4.0	12.5	12.9	9.6	12.3	14.8	2	0.00	-0.40	0.0	0.0	0.0	77	Y		N
TRDN	3000000E	93.019	CP	36	36	38		0	0	3.0	3	5	MM	5.8	10.20	3.0	0	CG	CG	10.40	2.6	13.1	12.2	12.8	4.0	11.9	5.0	2	-0.20	-0.80	0.5	0.0	0.0	100	Y		N
TRDN	2000810	0.390	CP	36	36	40		0	0	3.0	3	3	MM	5.6	9.70	3.0	0		S	9.70	2.9	2.9	11.2	11.7	6.2	11.1	11.2	2	-0.90	-1.40	0.0	0.0	0.0	100	Y		N
TRDN	1500000	12.105	CP	60	60	40		0	0	4.0	3	3	MM1	0.0	2.70	5.0	0	NA	CG	2.70	5.0	5.1	7.3	7.5	6.6	6.4	8.0	2	-0.20	-0.40	0.0	0.0	0.0	125	Y		N
TRDN	1500000	13.066	CP	60	60	34		0	0	6.0	4	4	MM1	0.0	4.00	5.0	0	NA	CG	4.10	5.4	5.4	9.2	9.3	6.5	8.2	11.3	2	-0.20	-0.30	0.3	0.0	0.0	83	Y		N
TRDN	2085000	1.291	CP	24	24	40		0	0	2.0	5	1	N	5.7	9.30	2.0	0		O_S	9.30	2.0	2.3	11.1	11.0	2.0	10.9	2.5	2	-0.30	-0.20	0.0	0.0	0.0	100	Y		N
TRDN	2000000	129.831	CP	72	72	70		0	0	NA	0	0	PA	5.80	13.70	6.5	0		ORG	14.20	6.3	6.3	17.2	19.6	9.9	17.0	NA	2	-0.90	-3.30	0.7	-0.5	-8.3	####	Y		N
TRDN	2900000	15.063	CP	36	36	30		0	0	NA	3	2	PA5	5.80	8.80	2.9	0		O	7.70	2.9	3.0				10.0	3.9	2	-10.60	-10.60	-3.7	0.1	3.3	####	Y		N
TRDS	2000000	76.716	CP	36	36	40		0	10	1.0	1	1	N	5.8	9.20	3.0	0		O	9.25	3.5	3.5	12.8	12.70	0.3	12.5	1.6	2	-0.05	0.05	0.1	0.0	0.0	300	Y		N
TRDS	2058000	0.960	CP	36	36	41	PRO	0		10.0	0	0	PA	5.5	7.90	3.0	0		O	8.00	2.4	2.9	8.9	11.00	8.0	8.8	9.7	2	0.60	-1.50	0.2	0.0	0.0	30	Y		N
TRDS	2300000	0.550	CP	36	36	40	PRO	0		4.3	1	1	PA1	5.4	11.51	2.3	0		O	10.59	2.8	2.9	11.4	11.68	8.9	10.8	8.9	2	-1.74	-1.97	-2.3	0.7	23.5	70	Y		N
TRDS	3000000	58.130	CP	24	24	40	PRO	0		3.3	4	4	PA1	5.4	6.53	2.1	0		O	8.36	1.9	2.0	8.6	9.09	3.3	8.0	3.3	2	-1.21	-1.71	4.6	-0.1	-3.3	61	Y		N
TRDS	3000000	58.750	CP	24	24	30	PRO	0		5.9	2	8	PA1	5.4	8.50	2.0	0		O	8.30	1.3	1.3	9.2	9.68	4.3	9.1	4.3	2	0.07	-0.43	-0.7	0.0	1.6	34	Y		N
CRD	2150000	3.430	cp	18	18	30				2.2	1	1	pa	5	6.14	1.9	0		s_o	6.69	1.8	1.8	7.3	8.8	5.0	7.45	8.8	2	0.30	-1.14	1.9	-0.4	-26.7	68	Y		N
CRD	2100000	1.590	cp	18	18	30				2.2	3	2	pa	5	7.61	1.5	0		fg	8.14	1.5	3.0	7.3	7.6	2.5	10.43	4.1	2	-2.02	-2.29	1.7	0.0	0.0	68	Y		N
CRD	2100000	1.630	cp	18	18	30				4.6	1	1	pa	5	8.04	1.7	0		s	9.02	1.5	1.6	10.3	10.8	6.8	10.01	9.2	2	0.30	-0.19	3.3	-0.2	-13.3	33	Y		N
CRD	2100000	4.600	cp	24	24	30				2.2	3	1	pa	5	7.68	2.2	0		s_o	8.96	1.7	1.9	9.8	11.3	8.0	9.51	11.0	2	0.66	-0.88	4.3	-0.2	-10.0	91		?	Y
TRDN	2087000	0.144	CP	60	60	40		N	N	8.0	4	3	MM1	5.6	10.25	4.9	0		CG	10.80	5.0	7.4	16.3	16.8	11.7	15.7	16.1	2	1.00	0.50	1.4	0.1	2.0	63			Y
HRD	8578	1.203	CP	48	48	41	PRO	N	N	2.0	11	3	MM	5	7.41	4.09	0	NA	CG	8.5	4	5.4	12.92	13.38	7.4	12.81	8.4	2	0.88	0.42	2.7	-0.1	-2.3	200			Y
TRDN	3000000E	92.340	CP	18	18	34		N	N	3.0	6	6	HC	5.8	7.90	1.5	0	N	O	8.70	1.5	12.9	12.0	12.9	3.0	11.6	4.0	2	2.65	1.80	2.4	0.0	0.0	50			Y
TRDN	2087000	0.089	CP	18	18	30		N	N	3.0	8	8	HC2	5.6	7.80	1.5	0		CG	8.40	1.7	2.4	10.9	11.2	3.7	10.4	4.8	2	1.10	0.80	2.0	0.0	0.0	50			Y
TRDN	1445000	3.826	CP	18	18			100	NA	NA	0	1	PA	5.4	NA	NA	NA	NA	O	9.90	1.6	1.6	10.9	11.4	7.9	10.5	11.0	2	-0.10	-0.60	####	#####	#####	####			Y
HRD	8578	0.129	CP	24	24	30	PRO	100	0	15.0	3	16	HC												5			2	0.00	0.00	0.0	2.0	100.0	13			Y
WRD	6590	26.624	CP	18	18	28		100		3.5	1	1	PA	4.75		1.5	100	CS	S_O	11.20	1.2	1.1	11.40	13.10	6.2	10.70	10.8	2	0.70	-1.00	####	0.0	0.0	43			Y
SRD	7540	107.755	CP	36	36	47	PRO	100	0	5.6	2	2	N	5	9.1	3	0	N	CG_SC	10.2	3	16.4	15.1	16.1	2.5	14.7	6	2	2.90	1.90	2.3	0.0	0.0	54			Y
TRDS	2050300	8.100	CP	60	60	40	PRO	100		7.0	7	9	HC2	5.5	7.80	1.3	0		LC	10.65	4.9	5.9	15.9	16.10	6.5	15.3	14.0	2	0.55	0.35	7.1	3.7	74.0	71			Y
TRDS	2050300	7.000	CP	24	24	30	PRO	100		6.2	4	19	MM	5.8	8.39	0.0			CG	9.60	2.0	2.3	13.2	13.60	3.5	13.0	5.0	2	2.00	1.60	4.0	2.0	100.0	32			Y
PRD	6441	0.613	PA	48	48	30	PRO	90	0	5	1	1	PA_PA	5.30	7.2	5.1	####	CG	O	6.7	3.2	3.3	8.9	9.2		8.6		2	-0.70	-1.00	-1.7	-1.1	-27.5	80			Y
PRD	6402	18.149	CP	48	48	34	PRO	90	0	15	1	2	PA_PA	5.30	6.85	2	90	O	O	7.3	3.3	3.8	10.3	11.1	2.9	9.6	3.8	2	0.50	-0.30	1.3	2.0	50.0	27			Y
PRD	6402	19.280	CP	18	18	30	PRO	90	0	3	2	1	PA_PA	5.30	7.6	1.4	0	N	O	8.1	1.5	2.1	10.5	10.9	1.8	9.9	2.9	2	1.30	0.90	1.7	0.1	6.7	50			Y
PRD	6410	1.565	CP	36	36	72	PRO	80	5	6	0	3	PA_HC	5.30	18.7	2.9	0	N	ORG	18.82	2.8	2.7	20.1	20.32	12	19.9	14.7	2	-1.30	-1.52	0.1	0.1	3.3	50			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WS	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
PRD	6235	17.579	CP	36	36	34	PRO	80	0	5.3	1	1	PA_NT	5.55	8.20	2.6	50	O_S	O	8.20	3.0	4.6	12.70	14.50	2.2	11.40	15.3	2	3.30	1.50	0.0	0.4	13.3	57			Y
PRD	6030	11.712	CP	48	72	57	PRO	75	0	4.8	4	3	MM_MM	5.37	8.20	1.9	100	FG	CG	8.25	2.2	2.2	10.5	10.7	6.4	10.2	7.6	2	0.25	0.05	0.1	2.1	52.5	125			Y
TRDN	2086000	1.221	CP	48	48			75	0	NA	1	5	PA5	5.7	7.50	3.4	100	O	O	8.70	1.6	1.4	8.5	8.8	NA	8.3	NA	2	-1.50	-1.80	####	0.6	15.0	####			Y
TRDN	1500000	0.375	CP	36	36	40		75	75	3.3	3	2	ES	5.6	10.85	3.0	0		O	11.10	2.4	3.2	13.8	14.3	10.9	13.4	15.2	2	0.80	0.30	0.6	0.0	0.0	91			Y
TRDN	2000860	1.828	CP	36	36	60		70	80	2.4	3	1	MM1	5.7	14.00	2.9	0		S	14.80	3.0	3.9	18.6	19.6	7.6	17.9	17.2	2	1.80	0.80	1.3	0.1	3.3	125			Y
PRD	6435	0.942	CP	48	48	32	PRO	60	0	4	2	2	MM_PA	5.30	7.03	4	0	N	G_OR	7.23	4.1	4.8	9.17	9.5	10	9.07	40	2	-1.83	-2.16	0.6	0.0	0.0	100			Y
TRDN	2000860	1.405	CP	36	36	40		60	0	3.6	3	3	MM1	5.7	7.20	2.5	0		O_F	7.50	3.0	3.1	9.9	10.1	4.3	9.3	5.2	2	-0.40	-0.60	0.8	0.5	16.7	83			Y
WRD	6265	7.693	cp	48	48	48		60	0	7.5	19	17	hc	5	4.25	2.2	0	0	lc_sc	11.75	4	4.4	15.1	15.2	9	14.8	10.2	2	-0.55	-0.65	15.6	1.8	45.0	53			Y
TRDS	3030000	5.830	PA	72	95	46	PRO	60		11.5	14	17		5.4	10.20	3.6	90	LC	BO	9.91	5.5	6.6	15.8	16.73	5.9	15.2	12.8	2	1.28	0.39	-0.6	2.4	40.4	69			Y
WRD	6590	26.544	CP	36	36	38		60	0	15.2	2	1	PA	4.00	6.50	2.6	0		S	8.15	3.0	3.2	11.10	11.70	7.3	10.70	8.3	2	0.55	-0.05	4.3	0.4	13.3	20			Y
PRD	6333	1.069	CP	36	36	36	PRO	60	0	8.4	16	14	HC_HC	5.37	10.90	2.4	0	N	LC	13.25	3.0	4.1	16.6	16.9	7.5	15.9	9.1	2	0.65	0.35	6.5	0.6	20.0	36			Y
TRDS	3030000	11.200	CP	18	18	32	PRO	50	5	2.0	3	3	MM	5.7	7.61	1.1	100	O	O	7.90	1.3	1.5	8.4	8.66	1.3	7.9	4.3	2	-0.56	-0.85	0.9	0.4	25.7	76			Y
TRDN	2000000	134.694	CP	36	36	40		50	20	2.1	14	16	HC2	5.80	9.70	3.0	40	CG_LC	FS_LC	13.10	1.6	NA	NA	NA	NA	15.7	3.8	2	######	#####	8.5	0.0	0.0	143			Y
HRD	8578	3.490	CP	18	18	37	PRO	50	0	1.5	11	6	HC	5	9.05	1.25	25	FG	FG	12.9	0.6	1.8	13.3	13.45	1.5	13.2	2	2	-0.05	-0.20	10.4	0.3	16.7	100			Y
TRDN	2000900	0.474	CP	24	24	30		50	20	NA	1	1	PA5	5.7	6.70	1.5		O	O	7.30	1.4	1.5	6.3					2	-8.70	-2.40	2.0	0.5	25.0	####			Y
PRD	6319	7.736	CP	24	24	38	PRO	50	0	4.2	19	17	HC_HC	5.37	12.2	2	25	CG	CG	14.45	1.4	1.4	15	15.3	4.2	14.7	12.0	2	-0.55	-0.85	6.1	0.0	0.0	48			Y
PRD	6416	1.841	CP2	48	48	40	PRO	50	5	12	5	7	HC_HC	5.3	9.08	2.4	0	N	LC	8.98	4.0	6.4	16.74	17.02	8.7	13.98	18.5	2	4.04	3.76	-0.2	1.6	40.0	33			Y
PRD	6352	7.000	CP	36	36	50	PRO	50	0	6.3	14	12	HC_HC	5.37	20.2	2.2	0.0	N	LC	27.58	3	7.1	34.31	34.91	8.2	33.91	9	2	4.33	3.73	14.8	0.8	26.7	48			Y
TRDS	2050400	3.350	CP	36	36	40	PRO	40		6.0	14	11	HC2	5.6	11.05	1.4	100	LC	LC	11.50	1.6	1.7	12.7	12.70	2.6	12.2	6.4	2	-0.40	-0.40	1.1	1.6	53.3	50			Y
TRDN	1480000	4.090	CP	36	36	29		30	0	2.9	9	4	HC2	5.40	8.55	1.0	100	FG_CG	CG_B	8.80	1.8	1.8	10.4	10.7	5.4	9.9	8.9	2	0.10	-0.20	0.9	2.0	66.7	103			Y
TRDN	2000810	0.300	CP	36	36	30		30	10	3.0	7	10	HC	5.6	7.00	3.0	20/80	CG	S_CG	8.40	2.1	2.2	10.6	10.7	4.9	10.5	8.1	2	0.20	0.10	4.7	0.0	0.0	100			Y
PRD	6402	22.952	CP	48	48	40	PRO	30	0	4.7	5	3	MM_MM	4.75	9.62	1.8	100	N	SC_FG	10.96	1.9	1.9	12.92	13.04	5.10	12.2	12.6	2	0.18	0.06	3.4	2.2	55.0	85			Y
PRD	6402	19.268	CP	36	36	44	PRO	30	0	4.1	2	1	MM_PA	5.30	8.6	2.8	0	N	O	9.2	2.9	3.2	11	11.3				2	-0.80	-1.10	1.4	0.2	6.7	73			Y
PRD	6416	2.348	CP2	48	48	62	PRO	30	0	5	4	4	MM_MM	5.3	13.52	4.1	0	N	LG_SC	15.26	4.0	5.2	20.44	21.02	4.9	19.54	9.2	2	1.76	1.18	2.8	-0.1	-2.5	80			Y
PRD	6430	1.173	CP	24	24	46	PRO	30	0	3.4	4	3	NT	4.75	14.2	2	0	N	FG	16.80	1.8	2.1	19.86	19.92	4.30	18.0	12.5	2	1.32	1.26	5.6	0.0	0.0	59			Y
PRD	6407	7.338	CP	48	48	54	PRO	29	0	3.90	5	4		5.55	14.9	2.8	90	SC	SC	15	4.0	5.7	19.66	20.16	4.7	19.2	9.3	2	1.16	0.66	0.3	1.2	30.0	103			Y
PRD	6434	4.497	CP	36	36	34	PRO	28	0	4.4	4	3	MM_MM	4.75	8.72	1.9	100	FG	SC_FG	8.62	2.7	2.8	11.10	11.28	3.60	10.4	8.2	2	-0.04	-0.22	-0.3	1.1	36.7	68			Y
WRD	6265	4.516	cp	48	48	41		25	0	3.1	2	1	mm	4.75	8.1	4.1	75	s	s	8.1	4.2	4.3	11.9	12	3.2	11.8	3.6	2	-0.30	-0.40	0.0	-0.1	-2.5	129			Y
TRDS	3030000	15.540	CP	48	48	44	PRO	25		3.3	3	3	MM	4.9	10.40	2.5	50	SC	LC	11.05	2.5	2.5	13.5	13.58	3.0	13.2	4.3	2	0.07	-0.03	1.5	1.5	38.5	122			Y
TRDN	2079000	7.488	CP	36	36	30		25	0	6.0	5	6	MM1	5.5	10.80	2.2	10	CG_SC	SC_BC	11.60	2.5	2.6	14.0	14.4	4.3	13.8	6.6	2	0.30	-0.10	2.7	0.8	26.7	50			Y
PRD	6438	0.385	CP	24	24	40	PRO	25	10	2.5	5	3	MM_PA	5.30	10.5	1.4	0.0	N	CG	10.6	1.7	1.8	11.7	12.8	50	11.7	50	2	0.50	-0.60	0.2	0.6	30.0	80			Y
PRD	6040	8.525	CP	36	36	44	PRO	25	0	2.4	3	16	MC_HC	5.37	9.25	3.0	0	N	O	11.45	3.0	4.4	15.2	15.7	5.9	15.0	8.1	2	1.25	0.75	5.0	0.0	0.0	125			Y
PRD	6430	1.013	CP	24	24	30	PRO	25	0	3.3	2	3	MM_MM	4.75	5.82	2	0	N	O	6.28	2.0	2.2	9.05	9.20	2.40	7.9	4.5	2	0.92	0.77	1.5	0.0	0.0	61			Y
PRD	6407	6.976	CP	48	48	34	PRO	22	0	3.20	5	3		5.55	8.66	3.1	100	CG	CG	8.56	3.8	3.8	12.46	12.6	3.2	12.06	6	2	0.24	0.10	-0.3	0.9	22.5	125			Y
PRD	6420	1.578	CP	48	48	30	PRO	20	30	3.5	12	5	HC_HC	5.30	9.04	3.8	75	LG	LG	9.04	3.0	3.2	11.06	11.2	7.7	10.82	13.9	2	-0.84	-0.98	0.0	0.2	5.0	114			Y
HRD	8578	0.111	CP	24	24	32	PRO	20	10	3.0	3	17	HC															2	0.00	0.00	0.0	2.0	100.0	67			Y
TRDN	2085000	1.123	CP	48	48	40		20	0	3.8	3	3	MM1	5.7	9.20	2.6	100	CG	CG_SC	9.70	2.7	2.7	12.5	12.6	5.4	11.9	7.5	2	0.20	0.10	1.3	1.4	35.0	105			Y
WRD	6265	2.515	cp	48	48	30		20	10	1.6	8	3.5	mm	4.75	6.4	3	60	fg	fg	6.9	3.75	3.7	10.2	10.7	1.6	9.2	2	2	0.05	-0.45	1.7	1.0	25.0	250			Y
TRDN	3000000B	92.743	CP	120	120	70		20	0	15.2	6	6	MC	5.8	17.20	10.0	0	N	B	20.60	10.0	32.5	28.4	29.0	16.1	28.2	17.1	2	-1.59	-2.20	4.9	0.0	0.0	66			Y
TRDN	2084015	0.133	CP	72	72	54		20	0	10.2	12	10	HC2	5.7	15.50	5.4	100	SC	BD_SC	15.90	6.4	6.4	23.0	23.3	11.0	22.4	11.6	2	1.00	0.70	0.7	0.6	10.0	59			Y
TRDS	3030600	0.030	CP	36	36	35	PRO	20		4.3	5	6	MM1	5.7	9.70	1.8	100	CG	CG	9.90	2.2	5.2	13.1	13.40	4.1	12.1	4.3	2	1.30	1.00	0.6	1.2	40.0	70			Y
TRDS	3030000	19.020	CP	24	24	40	PRO	20		2.0	8	7	HC	5.7	15.65	2.0	0		CG	7.85	0.7	0.8	9.0	9.10	2.7	8.8	5.2	2	0.55	0.40	-19.5	0.0	0.0	100			Y
HRD	8578	1.020	CP	24	24	37	PRO	20	0	3.5	9	8	HC2	5	10.2	7.25	0	NA	SC	11.4	2	2.4	18.05	18.55	9	17.6	11	2	5.15	4.65	3.4	-5.3	-262.5	57			Y
HRD	8578	3.020	CP	24	24	36	PRO	20	20	2.5	14		HC2	5	11.1	2.2	0	NA	CG	13.54	1.65	1.8	16.74	16.93	4.5	16.31	5.5	2	1.74	1.55	6.8	-0.2	-10.0	80			Y
TRDN	1445700	1.102	CP	24	24	42		20	0	2.1	6	3	MM1	5.4	9.50	1.5	0		CG_SC	10.70	2.0	2.8	13.3	13.4	4.2	13.0	4.7	2	0.70	0.60	2.9	0.5	25.0	95			Y
TRDN	2000810	1.107	CP	36	36	40		15	5	3.0	3	2	PA	5.6	13.60	2.3	5_10	O	F	13.60	2.6	2.6	15.1	15.6	5.7	14.6	8.3	2	-0.60	-1.10	0.0	0.7	23.3	100			Y
PRD	46041	0.831	PA		78	38	MIT	15	0	5	3	3	MM_MM	5.30	8.2	4.2	100	SC_LG	SC	9.24	3.8	4	13.24	13.34	4.7	12.58	7.2	2	0.30	0.20	2.7	-4.2	#####	130			Y
TRDN	2000000	108.011	CP	36	36	48		15	0	3.5	13	NA	HC2	5.6	10.80	1.6	45	CG	FG_CG	10.90	1.7	1.7	NA	NA	NA	NA	NA	2	######	#####	0.2	1.4	46.7	86			Y
TRDN	2085000	3.019	CP	60	60	40		15	0	9.9	6	5	AF1	5.7	8.30	4.7	100	LC_B	LC_B	9.60	4.0	4.1	13.3	13.6	4.2	12.9	14.0	2	0.00	-0.30	3.3	0.3	6.0	51			Y
TRDS	3000000	53.180	PA	24	30	36	PRO	15	15	3.6	8	7	HC2	5.4	6.10	1.6	100	CG	CG	7.54	1.6	1.6	9.3	9.41	2.6	8.9	3.3	2	0.23	0.16	4.0	0.4	19.6	69			Y
PRD	6410	0.513	CP	36	36	50		15	5	1.5	5	8	HC_HC	5.30	13.3	2.6	75	LG	LG	13.34	2.6	2.7	15.92	16.4	1.7	15.14	7.8	2	0.46	-0.02	0.1	0.4	13.3	200			Y
TRDN	1470000	7.225	CP	60	60	85		15	0	20.0	1	1	PA5	5.40	22.70	3.9	0		O	23.70	4.9	5.1	27.1	NA	25.0	NA	28.0	2	######	-1.50	1.2	1.1	22.0	25			Y
PRD	6407	1.743	CP	24	24	37	PRO	15	0	9	4	5	MM_MM	5.30	9.4	1.6	0	0	CG	9.5	2.0	3.2	12	12.2	1.9	11.3	8.6	2	0.70	0.50	0.3	0.4	20.0	22			Y
TRDN	2000000	125.242	CP	48	48	60		15	0	4.5	4	4	MM1	5.6	13.20	3.2	0	NA	FG	14.70	3.9	4.7	18.8	19.2	8.8	18.2	13.3	2	0.60	0.20	2.5	0.8	20.0	89			Y
WRD	6590	27.907	CO	38	76	33		15	0	4	2	9	HC	4.75	6.90	3.6	100	SC_LC	SC	8.65	4.2	4.2	15.90	16.20	3.9	14.90	5.5	2	3.35	3.05	5.3	-0.4	-13.7	158			Y
PRD	6416	1.842	CP2	48	48	40	PRO	15	0	12	5	7	HC_HC	5.3	9.12	3.3	90	SC_LG	LC	8.88	4.0	6.7	16.74	17.02	8.7	13.98	18.5	2	4.14	3.86	-0.6	0.7	17.5	33			Y
HRD	8578	0.887	CP	36	36	36	PRO	15	0	5.0	8	10	HC2	5	7.35	2.56	50	SC	SC	9.92	3	3.5	13.57	13.79	9	13.62	10	2	0.87	0.65	7.1	0.4	14.7	60			Y
PRD	6317	2.112	CP	72	72	44	PRO	15	15	8.0	9	7	HC_MM	5.37	10.18	6.0	0	N	LC	12.22	6.0	8.0	20.04	20.32	8.6	19.34	13.2	2	2.10	1.82	4.6	0.0	0.0	75			Y
PRD	6434	4.716	CP	36	36	40	PRO	15	0	3.6	4	3	MM_MM	4.75	6.26	3	0	N	CG	8.60	3.1	4.2	12.71	12.92	3.70	12.0	8.2	2	1.22	1.01	5.9	0.0	0.0	83			Y
HRD	8578	2.360	CP	18	18	29	PRO	10	0	2.5	4	9	MM	5	7.55	1.3	90	FG	FG	8.65	1.31	1.25	9.64	10.03	3	9.51	3.5	2	0.07	-0.32	3.8	0.2	13.3	60			Y
HRD	8578	2.445	CP	18	18	25	PRO	10	0	3.0	20	16	MM	5	6.46	1.34	100	FG	FG	6.65	0.98	1.75	8.05	8.39	1.9	8.05	2	2	0.76	0.42	0.8	0.2	10.7	50			Y
PRD	6402	10.048	CP	24	24	30	PRO	10	0	2.90	8	11	HC_HC	4.95	6.14	1.6	100	CG	CG	6.7	1.6	1.6	8.4	8.68	2.2	8	3.4	2	0.38	0.10	1.9	0.4	20.0	69			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
TRDN	2000860	1.069	CP	48	48	40		10	0	7.2	2	6	PA	5.7	8.90	3.7	0		O	9.20	4.0	5.3	13.8	14.0	4.2	13.5	7.9	2	0.80	0.60	0.7	0.3	7.5	56			Y
PRD	6317	5.880	CP	36	36	30	PRO	10	0	4.0	26	5	HC_HC	5.37	6.80	2.6	0	N	B_LC	8.40	3.0	5.4	13.78	14.32	3.7	13.20	8.3	2	2.92	2.38	5.3	0.4	13.3	75			Y
TRDS	2050050	0.820	CP	108	108	80	PRO	10	5	4.0	9	10	HC3	5.5	26.00	9.8	0		B	32.30	9.6	10.0	42.4	43.40	8.4	41.2	12.4	2	1.50	0.50	7.9	-0.8	-8.9	225			Y
TRDS	3030000	0.050	PA	91	141	48	PRO	10		16.4	13	10		5.4	7.38	7.9	0		BO	10.27	7.9	11.5	18.8	20.07	0.0	18.4	29.5	2	1.94	0.62	6.1	-0.3	-3.8	72			Y
PRD	6326	5.861	CP	24	24	32	PRO	10	0	4.6	8	12	HC_HC	5.37	9.15	1.8	50	SC_CG	SC	10.30	2.0	2.9	14.5	15.4	4.3	14.2	5.1	2	3.10	2.20	3.6	0.2	10.0	43			Y
TRDN	2000860	0.715	CP	36	36	40		5	0	3.7	3	6	MM1	5.7	6.70	3.1	100	O	O_CG	7.50	2.5	2.5	9.0	9.2	4.6	8.8	5.9	2	-0.80	-1.00	2.0	-0.1	-3.3	81			Y
TRDS	2050610	0.300	PP	36	36	40	PRO	5		5.5	6	4	MM1	5.6	11.85	2.1	75	SC	SC	11.75	3.0	3.3	15.0	15.10	7.9	14.7	10.5	2	0.35	0.25	-0.2	0.9	30.0	55			Y
TRDN	2085000	3.115	CP	36	36	36		5	0	7.2	6	7	AF1	5.7	8.90	2.9	10	LC	LC_CG	9.00	3.0	3.7	12.0	12.2	5.1	11.4	10.7	2	0.20	0.00	0.3	0.1	3.3	42			Y
TRDN	2000850	0.392	CP	24	24	32		5	15	2.0	2	0	PA5	5.7	6.40	1.9	0		O	7.30	1.9	1.9	8.3					2	-9.20	-0.90	2.8	0.1	5.0	100			Y
TRDS	2050000	5.050	CP	36	36	30	PRO	5		2.7	17	7	HC2	5.0	6.80	2.8	0		CG	6.90	3.0	4.0	10.9	10.20	3.1	10.5	7.3	2	0.30	1.00	0.3	0.2	6.7	111			Y
TRDS	2057000	2.140	CP	18	18	45	PRO	5		3.5	6	3	MM1	5.0	9.45	1.6	80	SC	SC	10.25	1.3	1.5	11.5	11.70	2.8	11.4	4.5	2	0.15	-0.05	1.8	-0.1	-6.7	43			Y
HRD	8578	0.219	CP	36	36	30	PRO	5	5	5.0	8	12	HC	5	9.02	2.55	10	90	CG	9.93	2.2	2.2	10.93	15.50	5.6	14.88	6	2	3.37	-1.20	3.0	0.5	15.0	60			Y
TRDN	2085000	2.659	CP	48	48	40		5	0	10.5	6	6	AF1	5.7	8.20	4.0	10	LC	LC_B	8.00	4.0	4.3	12.0	12.6	3.6	11.0	11.5	2	0.60	0.00	-0.5	0.0	0.0	38			Y
TRDS	3030100	0.250	CP	18	18	30	PRO	5	10	1.5	30	12	HC2	5.7	8.10	1.0	0		CG	9.40	1.5	2.0	11.2	11.30	4.3	10.8	5.7	2	0.40	0.30	4.3	0.5	33.3	100			Y
HRD	8578	0.928	CP	24	24	30	PRO	5	0	2.5	7	6	HC2	5	8.39	1.83	10	CG	CG	9.72	2	2.2	12.55	12.78	3.4	12.36	3.7	2	1.06	0.83	4.4	0.2	8.5	80			Y
HRD	8578	3.386	CP	18	18	36	PRO	5	0	2.5	12	16	HC2	5	9.55	1.35	0	NA	FG	10.74	1.5	1.8	13.4	13.60	6	13.25	7.6	2	1.36	1.16	3.3	0.2	10.0	60			Y
HRD	8578	3.511	CP	36	36	30	PRO	5	0	3.0	8	15	HC2	5	10.1	2.92	0	NA	CG	10.9	3	3.5	14.91	15.02	4	14.65	4.8	2	1.12	1.01	2.6	0.1	2.7	100			Y
TRDS	3030000	16.420	CP	24	24	36	PRO	2		1.5	9	8	HC	5.4	9.40	2.0	0		FG	9.60	2.0	2.2	12.8	13.00	3.6	12.4	6.4	2	1.40	1.20	0.6	0.0	0.0	133			Y
PRD	6461	1.133	CP	36	48	48	PRO	0	0	4.2	6	4	HC_HC	4.75	12.7	1.9	100	SC	SC	13.55	2.0	1.9	15.19	15.39	4.20	14.4	6.4	2	-0.16	-0.36	1.8	1.1	36.7	95			Y
PRD	6241	0.727	CP	24	24	26	PRO	0	0	1.7	1	3	NT_NT	5.55	11.92	2.5	100	FG_S	S	12.73	2.3	2.3	14.85	15.10	1.9	14.43	2.3	2	0.07	-0.18	3.1	-0.5	-25.0	118			Y
TRDN	2934000	0.133	CP	48	48	40		0	0	3.1	3	5	MM1	5.6	11.55	3.6	100	FG_SC	FG_SC	12.70	3.1	2.9	15.4	15.6	2.6	15.1	3.7	2	-0.20	-0.40	2.9	0.4	10.0	129			Y
TRDN	1445000	9.731	CP	36	36	34		0	0	3.3	3	3	MM1	5.4	8.50	2.9	100	CG	FG_CG	9.00	2.7	2.7	11.5	11.6	5.5	11.3	7.2	2	-0.15	-0.20	1.5	0.1	3.3	91			Y
TRDN	1430310	0.356	CP	36	36	40		0	0	3.9	4	5	MM1	5.40	7.00	2.6	100	SC	SC_LC	7.60	3.0	3.4	10.7	10.8	5.4	10.4	6.8	2	0.20	0.10	1.5	0.4	13.3	77			Y
TRDS	3000000	49.500	CP	24	24	34	PRO	0		2.0	15	5	HC	5.4	9.22	1.6	100	SC	SC	9.84	2.0	2.3	11.4	11.55	3.3	11.2	8.2	2	-0.26	-0.36	1.8	0.4	19.6	102			Y
TRDS	3000000	49.360	CP	48	48	40	PRO	0		4.6	13	7	HC	5.4	7.18	2.8	100	SC	SC	8.27	3.3	3.3	11.2	11.38	4.9	10.8	7.9	2	-0.16	-0.33	2.7	1.2	30.3	87			Y
TRDS	2054000	6.540	cp	48	48	41		0	999	3.2	13	10	hc	5.0	10.80	3.1	100	lc_sc_fg	fg_lc	11.80	2.9	3.0	14.4	14.80	2.8	14.2	5.3	2	0.10	-0.30	2.4	0.9	22.5	125			Y
TRDS	2000000	77.077	CP	48	48	40		0	0	1.0	3		MM	5.8	8.90	3.4	100	LG	LG	9.80	3.6	3.7	13.6	13.55	2.9	13.4	8.5	2	0.15	0.20	2.3	0.6	15.0	400			Y
TRDS	3030105	0.001	CP	24	24	26	PRO	0		2.3	7	3	MM1	5.7	7.10	2.0	100	O	CG	7.70	1.5	1.6	9.0	9.10	2.5	8.4	6.1	2	-0.10	-0.20	2.3	0.0	0.0	87			Y
TRDS	3015300	0.040	CP	36	36	40	PRO	0	0	2.6	3	4	MM1	5.6	12.60	2.6	100	CG_FG	CG_SC	13.30	2.7	2.8	16.1	16.20	2.3	15.8	8.3	2	0.20	0.10	1.8	0.4	13.3	115			Y
TRDS	2059300	0.220	CP	48	48	32	PRO	0		4.0	8	2	MM1	5.6	8.40	3.3	100	FG	FG	8.80	3.1	3.1	11.7	12.05	2.1	11.2	8.6	2	0.15	-0.25	1.3	0.7	17.5	100			Y
WRD	6265	2.524	cp	24	24	30.5		0	0	2.7	9	8	mm	4.75	8	1.35	100	s	sc	9.3	1.4	1.3	10.1	10.4	3.6	9.9	10.4	2	-0.30	-0.60	4.3	0.7	32.5	74			Y
TRDN	2000000	122.678	CP	30	30			0	0	6.0	2	3	MM1	5.6	11.80	1.7	100	FG	O	13.40	1.9	2.1	15.2	15.6	3.5	14.4	5.5	2	0.30	-0.10	####	0.8	32.0	42			Y
TRDS	2050000	3.890	CP	24	24	26	PRO	0		5.8	6	8	HC2	5.0	6.60	1.4	100	CG	CG	6.85	1.7	1.8	8.5	8.70	6.1	7.9	8.3	2	0.15	-0.05	1.0	0.6	30.0	34			Y
PRD	6030	8.775	CP	36	36	40	PRO	0	0	3.2	3	4	MM_MM	5.37	11.60	3.0	100	FG	CG	11.65	3.0	3.3	14.9	15.0	4.9	14.7	5.7	2	0.35	0.25	0.1	0.0	0.0	94			Y
PRD	6328	0.103	PA	36	60	32	PRO	0	0	3.3	10	4	HC_HC	5.37	7.95	3.0	100	SC	SC	8.35	2.8	2.8	10.7	11.6	2.7	10.6	3.5	2	0.45	-0.45	1.3	0.0	0.0	152			Y
PRD	6402	18.360	PA	48	60	34	PRO	0	0	6	3	3	MM_MM	5.30	8.1	2.8	100	CG	CG	7.9	2.9	3	10.7	11.5	6.7	10.4	9.3	2	0.70	-0.10	-0.6	1.2	30.0	83			Y
PRD	6415	8.267	CP	48	48	36	PRO	0	0	2.60	1	2	NT_NT	4.95	6.82	4	100	O_FS	CG	6.56	4.0	4.2	10.66	11.16	1.7	10.12	5.5	2	0.60	0.10	-0.7	0.0	0.0	154			Y
PRD	6204	1.997	PA	36	60	40	PRO	0	0	13.4	12	5	AF	5.55	9.75	3.0	95	SC_CG	LC_SC	10.10	2.9	2.7	11.50	12.35	6.1	11.30	13.6	2	-0.65	-1.50	0.9	0.0	0.0	37			Y
TRDN	1480000	4.080	CP	36	36	32		0	0	3.3	3	4	MM1	5.40	7.50	2.3	90	SC_CG	CG_LC	8.40	3.0	3.1	11.3	11.4	4.2	11.1	14.4	2	0.00	-0.10	2.8	0.7	23.3	91			Y
TRDS	3000000	59.940	CP	48	48	50	PRO	0		5.6	5	7	MC2	5.4	10.20	4.1	80	SC	SC	18.73	4.5	4.9	21.9	22.44	8.2	21.1	13.1	2	-0.82	-1.38	17.1	-0.1	-2.5	72			Y
PRD	6434	4.388	CP	36	36	34	PRO	0	5	6	4	4	MM_MM	4.75	8.16	2.2	80	SC	CG	8.19	2.8	3.1	10.93	11.18	6.40	10.0	11.6	2	0.19	-0.06	0.1	0.8	26.7	50			Y
TRDN	2000000	118.937	CP	72	72	50		0	0	NA	1	7	PA5_MM1	5.4	11.60	5.2	75	SC	O	11.30	6.0	6.4	17.4	17.9	11.2	15.8	14.3	2	0.60	0.10	-0.6	0.8	13.3	####			Y
TRDN	2000000	108.128	CP	36	36	80		0	0	3.0	13	10	HC2	5.6	20.90	1.0	65	CG	SC_CG	22.60	2.5	2.7	25.2	25.3	2.7	24.6	6.7	2	0.20	0.10	2.1	2.0	66.7	100			Y
PRD	6416	0.233	CP	18	18	30		0	0	1.5	3	4	N	5.3	7.16	1.5	60	LG_ORG	G_OR	8.3	1.5	12	9.42	9.38	1	8.84	1.7	2	-0.42	-0.38	3.8	0.0	0.0	100			Y
HRD	8582	1.238	CP	36	36	38	PRO	0	0	3.2	2	12	MM_MM	5	10.1	3.1	50	FG	CG	11.24	2.9	2.9	13.3	13.60	12.8	13.1	13.3	2	-0.54	-0.84	3.0	-0.1	-3.3	94			Y
TRDN	1480000	2.280	CP	36	36	35		0	0	5.4	14	6	HC2	5.40	6.90	3.0	50	SC	LC_SC	7.60	2.7	2.8	10.3	10.6	5.7	9.3	8.7	2	0.30	0.00	2.0	0.0	0.0	56			Y
TRDN	2000000	83.391	CP	36	36	50		0	0	2.6	6	4	MM	5.8	12.10	3.0	50	O	S	15.10	2.0	2.1	16.9	17.2	1.2	16.5	3.1	2	0.10	-0.20	6.0	0.0	0.0	115			Y
TRDS	2058000	2.100	CP	24	24	40	PRO	0		2.0	9	14	HC2	5.6	8.45	2.0	50	O	O	9.75	1.5	1.6	10.0	10.40	1.5	9.9	3.0	2	-0.85	-1.25	3.3	0.0	0.0	100			Y
TRDS	2050000	5.390	CP	60	60	38	PRO	0		3.9	8	4	HC2	5.0	8.60	4.1	50	SC	LC	9.60	4.9	4.8	13.1	13.40	4.2	12.7	10.2	2	-1.10	-1.40	2.6	0.9	18.0	128			Y
TRDS	3000000	52.920	CP	96	96	56	PRO	0		10.5	8	5	MC2	5.4	10.20	7.5	50	BO	BO	14.30	6.7	6.7	20.3	20.73	13.1	19.9	17.1	2	-0.23	-0.62	7.3	0.5	5.7	76			Y
TRDS	2059000	0.012	CP	48	48	36	PRO	0		2.3	6	5	MM1	5.7	8.40	3.7	50	SC	CG	9.00	3.9	3.9	12.7	9.00	2.3	12.6	5.4	2	-3.90	-0.20	1.7	0.3	7.5	174			Y
TRDN	2085000	0.240	CP	36	36	32		0	0	2.1	3	3	MM1	5.7	8.70	2.9	40	CG	SC_CG	9.30	2.5	2.5	11.9	12.0	2.3	11.5	3.2	2	0.20	0.10	1.9	0.1	3.3	143			Y
TRDS	3030000	11.940	CP	36	36	52	PRO	0		3.0	4	5	MM	4.9	12.73	2.7	40	CG	CG	14.07	2.6	2.6	13.5	16.56	4.9	16.1	7.2	2	-0.13	-3.21	2.6	0.3	9.3	102			Y
TRDN	1470000	3.782	CP	24	24	30		0	0	3.5	6	0	MM1	5.40	6.00	2.0	40	LC	O_FG	6.10	1.8	2.1	8.2	8.7	4.9	7.8	10.9	2	0.80	0.30	0.3	0.0	0.0	57			Y
PRD	6415	12.729	CP	36	36	38	PRO	0	5	1.60	2	3	NT	4.95	5.58	3	30	CG	CG	6.86	2.9	3.2	9.66	10.04	3.6	8.84	6.5	2	0.28	-0.10	3.4	0.0	0.0	188			Y
PRD	6030	8.947	CP	36	36	38	PRO	0	0	2.8	5	6	MM_MM	5.37	9.55	3.0	25	SC	FG	9.65	2.9	3.0	12.8	13.3	3.2	12.2	4.4	2	0.75	0.25	0.3	0.0	0.0	107			Y
TRDN	1430000	3.176	CP	60	60	40		0	0	10.2	2	2	MM1	5.40	7.00	5.0	10	SC	CG_FG	7.10	5.1	5.1	11.7	11.7	7.4	10.2	11.1	2	-0.50	-0.50	0.2	0.0	0.0	49			Y
TRDN	2500000	0.677	CP	48	48	38		0	15	3.6	12	3	MM	5.6	8.60	4.0	10	SC	CG_SC	8.70	4.0	4.2	12.6	13.4	4.5	11.8	17.3	2	0.70	-0.10	0.3	0.0	0.0	111			Y
TRDN	2085000	1.325	CP	24	24	40		0	0	1.6	4	3	N	5.7	10.20	2.0	5	CG	O	10.80	2.0	2.3	12.9	13.0	1.3	12.7	1.8	2	0.20	0.10	1.5	0.0	0.0	125			Y
TRDN	2084000	0.265	CP	18	18	36		0	0	1.5	2	2	MM1	5.7	11.00	1.5	5	LG	FG_O	11.10	1.5	2.0	12.8	13.7	2.4	12.5	3.2	2	1.10	0.20	0.3	0.0	0.0	100			Y
HRD	8578	3.342	CP	24	24	33	PRO	0	0	2.5	8	10	HC2	5	9.15	1.9	0	NA	CG	10.83	2	2.7	12.75	12.95	4.7	12.55	7	2	0.12	-0.08	5.1	0.1	5.0	80			Y
PRD	6314	4.009	PA	36	48	46	PRO	0	0	3.0	4	4	HC_HC	5.37	8.12	3.2	0	N	B_LC	9.64	3.3	3.5	12.52	13.0	3.2	12.2	6.1	2	0.02	-0.42	3.3	-0.2	-6.7	133			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WS	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
PRD	6324	0.653	CP	36	36	36	PRO	0	0	3.2	13	11	HC_HC	5.37	9.15	3	0	N	SC	10.75	3	3.8	13.7	14	4.2	13.4	5.4	2	0.25	-0.05	4.4	0.0	0.0	94			Y
PRD	6326	3.478	CP	48	48	44	PRO	0	0	6.6	10	9	HC_HC	5.37	9.80	4.0	0	N	LC	10.65	4.0	4.0	13.7	14.3	4.7	13.7	4.7	2	-0.35	-0.95	1.9	0.0	0.0	61			Y
PRD	6358	0.881	CP	48	48	48	PRO	0	10	4.0	17	15	HC_HC	4.95	9.22	4.0	0	N	B	14.36	4.0	4.4	17.38	17.42	5.0	16.66	29.4	2	-0.94	-0.98	10.7	0.0	0.0	100			Y
PRD	6415	4.371	CP2	48	48	100	PRO	0	0	7.60	13	13	HC_HC	3.28	23.7	4	0	N	B	30.1	3.6	3.6	33.5	33.8	6.4	33.15	6.8	2	0.10	-0.20	6.5	0.0	0.0	53			Y
PRD	6204	5.895	CP	36	36	40	PRO	0	0	2.7	7	6	HC_MM	5.55	7.91	3.0	0	N	CG	10.56	3.0	3.0	13.16	13.46	2.6	13.01	3.6	2	-0.06	-0.36	6.6	0.0	0.0	111			Y
PRD	6328	0.650	CP	24	24	42	PRO	0	0	3.3	12	6	HC_MM	5.37	10.30	2.0	0	N	CG_SC	15.00	2.0	2.0	16.7	17.0	3.3	16.7	3.3	2	0.00	-0.30	11.2	0.0	0.0	61			Y
PRD	6420	1.725	CP	36	36	32	PRO	0	5	3	15	5	HC_MM	5.30	6.24	3	0	0	S_O	7.26	3.0	4.3	10.28	10.38	8.3	10.16	13.2	2	0.12	0.02	3.2	0.0	0.0	100			Y
PRD	40000	2.492	CP	48	48	42	PRO	0	0	6.2	8	7	HC1_HC1	5.55	7.25	3.9	0	N	LG_LC	8.44	4.0	4.5	12.24	12.35	4.1	11.80	9.3	2	-0.09	-0.20	2.8	0.1	2.5	65			Y
PRD	6441	0.196	CP	36	36	30	PRO	0	0	4.7	2	3	LC_LC	4.75	7.56	2.4	0	N	FG	8.24	2.5	2.7	10.40	10.62	8.30	10.0	10.4	2	-0.12	-0.34	2.3	0.6	20.0	64			Y
PRD	6350	5.363	CP	36	36	32	PRO	0	0	3.3	4	3	MC_MM	4.95	7.74	3.0	0	N	SC_CG	10.36	3.0	3.0	12.20	12.44	2.9	11.06	13.3	2	-0.92	-1.16	8.2	0.0	0.0	91			Y
PRD	6031	4.340	CP	48	48	38	PRO	0	0	6	3	3	MM_MM	5.37	7.45	4	0	N	O	8.15	4	4.2	9.6	12.2	6.4	9.6	15.0	2	0.05	-2.55	1.8	0.0	0.0	67			Y
PRD	6326	1.191	CP	48	48	48	PRO	0	0	6.1	2	6	MM_MM	5.37	12.35	4.0	0	N	S_O	12.90	4.0	4.4	15.6	16.4	9.2	15.6	9.2	2	-0.50	-1.30	1.1	0.0	0.0	66			Y
PRD	6350	16.628	CP	48	48	60	PRO	0	0	3.1	7	3	MM_MM	4.95	11.36	4.0	0	N	SC	16.42	4.0	4.9	20.48	20.56	4.4	19.18	15.0	2	0.14	0.06	8.4	0.0	0.0	129			Y
PRD	6407	4.558	CP	64	84	44	MIT	0	0	6.30	6	7	MM_MM	5.55	8.12	5.4	0	N	SC_CG	8.9	5.4	6	14.08	14.4	5.8	13.62	13.2	2	0.10	-0.22	1.8	-0.1	-1.3	111			Y
PRD	6430	1.628	CP	60	60	41	PRO	0	0	6	2	3	MM_MM	4.75	6.64	5	0	N	FG_SC	7.62	5.1	5.7	12.64	12.88	9.00	10.6	28.0	2	0.16	-0.08	2.4	0.0	0.0	83			Y
PRD	6408	0.345	CP	48	48	35	PRO	0	0	5.8	4	3	MM_-MM	5.30	6.2	4	0.0	N	CG	7.9	4.0	4.3	11.2	11.4	5.3	10.4	10.7	2	-0.50	-0.70	4.9	0.0	0.0	69			Y
PRD	6310	0.041	CP	24	24	45	PRO	0	0	2.8	3	1	MM_PA	5.37	11.25	2.0	0	N	O	12.85	2.0	2.9	14.7	15.1	4.9	14.2	6.0	2	0.25	-0.15	3.6	0.0	0.0	71			Y
PRD	6350	14.780	CP	36	36	34	PRO	0	0	2.4	3	1	MM_PA	4.95	7.62	3.0	0	N	FG_S	10.44	3.0	3.1	13.44	13.52	2.4	12.46	19.3	2	0.08	0.00	8.3	0.0	0.0	125			Y
PRD	6358	2.481	CP	48	48	40	PRO	0	0	3.6	3	1	MM_PA	4.95	6.52	4.0	0	N	SC_CG	9.30	4.0	4.0	11.24	12.26	12.6	10.64	19.8	2	-1.04	-2.06	7.0	0.0	0.0	111			Y
PRD	6403	0.016	CP	18	18	34	PRO	0	15	1.5	3	3	N	5.37	8.3	1.55	0	N	LG	10.06	1.7	1.7	11.44	11.84	0.8	11.12	1.6	2	0.08	-0.32	5.2	-0.1	-3.3	100			Y
PRD	6407	1.759	CP	18	18	30	PRO	0	0	2	3	4	N_N	5.30	6.8	1.5	0	N	CG	8.5	1.5	1.7	9.7	9.9	1.6	9.6	3.1	2	-0.10	-0.30	5.7	0.0	0.0	75			Y
PRD	6350	15.906	CP	36	36	32	PRO	0	0	2.3	11	7	NT_HC	4.95	7.56	3.0	0	N	FG_SC	9.16	3.0	3.2	12.14	12.38	2.0	11.04	9.7	2	0.22	-0.02	5.0	0.0	0.0	130			Y
PRD	6352	2.086	CP	24	24	36	PRO	0	0	2.4	6	7	NT_NT	4.95	11.26	2.0	0	N	CG	13.64	2.0	2.0	15.70	15.80	0.9	15.16	1.8	2	0.16	0.06	6.6	0.0	0.0	83			Y
PRD	6245	4.690	CP	48	48	50	PRO	0	0	4.0	6	5		5.55	12.70	4.7	0	N	CG_S	15.06	3.9	3.9	18.20	19.10	3.5	18.00	7.8	2	0.14	-0.76	4.7	-0.7	-17.5	100			Y
PRD	6245	7.052	CP	48	48	40		0	20	3.0	6	5		5.55	7.00	2.9	0	N	LC	8.34	4.0	4.3	11.46	11.70	15.7	11.30	17.7	2	-0.64	-0.88	3.4	1.1	27.5	133			Y
SRD	7500	13.741	CP	18	18	24	PRO	0	0	2	2	2	MC	5	5.09	1.61	0		SC	7.25	0.85	1.05	7.7	8.3	2	8	2	2	0.20	-0.40	9.0	-0.1	-7.3	75			Y
SRD	7500	12.500	CP	36	36	44	PRO	0	0	3	2	2	MC	5	7	3.5	0		SC	7.5	3.1	3.19	10.4	10.69	2.2	9.82	2.2	2	0.09	-0.20	1.1	-0.5	-16.7	100			Y
SRD	7500	13.621	CP	18	18	24	PRO	0	0	2	2	2	SWAMP	5	5.9	1.5	0		O	6.4	1.2	1.4	7.7	7.8	3	7.5	5	2	0.20	0.10	2.1	0.0	0.0	75			Y
SRD	7500	13.578	CP	18	18	24	PRO	0	0	SWAMP	2	2	SWAMP	5	6.55	1.45	0		O_SC	7.1	1.4	1.5	8.3	8.6	3.5	8	5.9	2	0.10	-0.20	2.3	0.1	3.3	####			Y
TRDN	2500000	2.095	CP	24	24	30		0	0	3.2	6	1	HC	5.6	8.20	2.0	0		CG	8.80	2.0	2.3	10.7	10.8	7.5	10.0	9.8	2	0.00	-0.10	2.0	0.0	0.0	63			Y
TRDN	2080000	0.713	CP	72	72	50		0	0	11.5	12	10	HC	5.0	11.00	6.0	0		B	12.90	6.0	7.8	14.6	14.9	6.8	12.9	10.3	2	-4.00	-4.30	3.8	0.0	0.0	52			Y
TRDN	2000000	103.352	CP	24	24	50		0	0	2.5	5	4	HC1	5.6	10.40	2.0	0	NA	FS_SG	13.60	2.0	2.7	12.9	13.0	2.7	12.6	3.0	2	-2.60	-2.70	6.4	0.0	0.0	80			Y
TRDN	2000000	111.438	CP	48	48	40		0	0	3.9	12	7	HC2	5.6	10.80	4.0	0		LC_CG	13.05	3.4	3.4	16.4	16.6	4.1	16.3	4.9	2	0.15	-0.05	5.6	0.0	0.0	103			Y
TRDN	2000000	129.675	CP	36	36	40		0	0	4.2	32	35	HC2	5.80	11.60	2.8	0		CG_LC	14.90	3.0	3.3	17.5	17.7	3.5	17.3	3.7	2	-0.20	-0.40	8.3	0.2	6.7	71			Y
TRDN	1480000	4.130	CP	24	24	34		0	0	3.5	10	5	HC2	5.40	7.90	1.8	0		FG_CG	8.50	2.1	2.2	10.4	10.6	6.1	10.1	8.4	2	-0.05	-0.25	1.8	0.2	10.0	57			Y
TRDN	1400000	6.284	CP	18	18	42		0	0	2.9	12	14	HC2	5.40	11.60	1.5	0		CG_SC	12.70	1.6	1.5	13.7	14.0	2.4	13.3	5.0	2	-0.30	-0.60	2.6	0.0	0.0	52			Y
TRDN	2087100	0.647	CP	60	60	40		0	0	7.0	5	2	MC	5.7	9.70	5.0	0		SC	11.10	4.8	5.2	15.3	15.6	4.3	15.0	9.6	2	-0.30	-0.60	3.5	0.0	0.0	71			Y
TRDN	1430310	0.663	CP	36	36	30		0	10	1.8	7	2	MM1	5.40	6.50	3.0	0		LG	7.30	3.1	3.2	10.5	10.7	3.0	10.0	3.3	2	0.30	0.10	2.7	0.0	0.0	167			Y
TRDN	2000850	0.080	CP	36	36	40		0	0	2.0	3	5	MM1	5.7	9.60	3.0	0		O	11.20	2.9	3.0	13.9	14.0	1.3	13.4	2.3	2	-0.10	-0.20	4.0	0.0	0.0	150			Y
TRDN	1445310	0.751	CP	24	24	41		0	0	2.0	5	2	MM1	5.40	9.10	2.0	0		CG	10.10	1.9	2.0	11.8	11.9	0.8	11.3	5.2	2	-0.10	-0.20	2.4	0.0	0.0	100			Y
TRDN	1445310	0.388	CP	24	24	54		0	0	2.0	3	2	MM1	5.40	7.40	2.0	0		O	8.40	2.0	2.1	10.5	10.6	1.1	10.2	3.2	2	0.20	0.10	1.9	0.0	0.0	100			Y
TRDN	1525200	1.183	CP	18	18	30		0	0	1.6	6	1	MM1	5.7	10.50	1.5	0		FG_CG	11.40	1.5	1.5	12.0	12.5	2.0	11.5	3.7	2	-0.40	-0.90	3.0	0.0	0.0	94			Y
TRDN	2085000	0.944	CP	36	36	38		0	0	3.5	4	3	MM1	5.7	7.80	3.0	0		SC_CG	9.00	2.9	3.1	11.7	11.9	3.3	11.2	7.0	2	0.00	-0.20	3.2	0.0	0.0	86			Y
TRDN	1530000	1.376	CP	36	36	40		0	0	4.3	5	9	MM1	6.1	10.70	3.0	0		CG_SC	11.30	2.9	3.0	13.7	13.8	5.5	13.3	7.0	2	-0.40	-0.55	1.5	0.0	0.0	70			Y
TRDN	1400000	2.989	CP	36	36	38		0	0	4.2	3	4	MM1	5.40	8.40	3.0	0		FS_O	8.90	3.0	3.4	11.8	12.0	3.9	11.5	6.1	2	0.10	-0.10	1.3	0.0	0.0	71			Y
TRDN	3000000B	91.255	CP	24	24	40		0	0	NA	5	0	PA	5.8	10.00	2	0	N	O	11.50	2	13.7	12.1	13.4	NA	NA	NA	2	-0.10	-1.40	3.8	0.0	0.0	####			Y
TRDN	2500000	1.095	CP	36	36	36		0	0	4.2	2	0	PA	5.6	7.30	3.1	0	NA	S	8.30	2.9	3.1	9.1	NA	NA	NA	NA	2	######	-2.10	2.8	-0.1	-2.7	71			Y
TRDN	2085000	2.571	CP	18	18	40		0	0	1.5	4	2	PA5	5.7	6.50	1.5	0		FG	8.00	1.7	1.8	9.7	9.8	1.3	9.4	2.0	2	0.10	0.00	3.8	0.0	0.0	100			Y
TRDS	2057000	2.830	CP	24	24	38	PRO	0		2.9	8	7	HC2	5.0	9.85	1.0	0		CG	10.40	2.0	2.1	12.4	12.50	2.6	12.2	3.6	2	0.10	0.00	1.4	1.0	50.0	69			Y
TRDS	3000000	59.170	CP	60	60	75	PRO	0		8.2	13	14	HC2	5.4	17.61	5.2	0		BO	24.40	5.0	5.3	29.1	29.45	7.5	28.8	14.8	2	0.03	-0.30	9.1	-0.2	-3.6	61			Y
TRDS	2050000	2.710	CP	36	36	41	PRO	0	5	2.2	8	8	HC2	5.6	8.50	2.8	0		CG	10.00	3.1	4.6						2	-13.10	-13.10	3.7	0.2	6.7	136			Y
TRDS	2059300	1.120	CP	48	48	40	PRO	0		6.0	4	8	MC2	5.7	10.60	4.0	0		CG	11.80	4.1	4.3	15.0	15.50	14.2	13.1	16.6	2	-0.40	-0.90	3.0	0.0	0.0	67			Y
TRDS	3030000	10.800	CP	36	36	40	PRO	0		2.3	4	2	MM	4.9	9.41	3.0	0		CG	10.63	2.3	2.3	12.7	12.73	5.9	12.3	7.4	2	-0.16	-0.23	3.0	0.0	1.6	131			Y
TRDS	2050300	2.970	CP	24	24	30	PRO	0		2.7	6	5	MM1	5.6	7.60	2.0	0		FG	8.62	2.0	2.1	10.6	10.80	1.9	10.5	2.1	2	0.18	-0.02	3.4	0.0	0.0	74			Y
TRDS	3030000	18.290	CP	18	18	38	PRO	0		1.0	3	6	MM2	5.4	7.90	1.5	0		S	9.60	1.5	19.0	10.6	10.70	3.1	10.0	6.0	2	-0.40	-0.50	4.5	0.0	0.0	150			Y
TRDS	3030000	0.340	CP	24	24	40	PRO	0		2.6	15	16		5.4	6.92	1.9	0		LC	8.07	2.0	2.4	9.7	9.97	3.9	9.5	7.2	2	-0.07	-0.36	2.9	0.1	4.9	76			Y
TRDS	3030000	6.540	CP	48	48	50	PRO	0		5.2	9	15		5.4	13.25	4.0	0		SC	14.66	3.6	3.7	17.2	17.68	10.2	16.9	16.4	2	-0.59	-1.08	2.8	0.0	0.0	76			Y
WRD	6265	2.862	cp	36	36	34		0	0	4.5	22	19	hc	4.75	8.25	3.1	0	0	lc	10.6	3	3.3	13.8	13.9	5.9	13.5	6.6	2	0.30	0.20	6.9	-0.1	-3.3	67			Y
WRD	52031	0.476	CP	18	18	30		0	0	2.0	7	6	HC_MM	5.00	7.80	2.0	0		CG	9.10	1.5	1.8	10.80	10.90	3.2	10.50	11.5	2	0.30	0.20	4.3	-0.5	-33.3	75			Y
PRD	6407	2.338	CP	18	18	32	PRO	0	0	5.30	2	6	HC_HC	5.55	6.26	1.5	0	N	S_O	6.14	1.5	1.9	7.38	7.82	3.2	6.9	5.4	2	0.18	-0.26	-0.4	0.0	0.0	28			Y
TRDN	2500000	0.227	CP	24	24	44		0	0	4.7	2	1	MC1	5.6	12.80	1.8	0		O	13.10	2.0	2.3	14.5	14.6	2.1	14.2	17.3	2	-0.50	-0.60	0.7	0.2	10.0	43			Y
TRDS	3015250	0.030	CP	48	48	40	PRO	0	0	9.2	7	6	MC1	5.5	7.90	4.0	0		LC_BR	8.30	4.0	4.2	12.0	12.40	8.4	11.6	9.1	2	0.10	-0.30	1.0	0.0	0.0	43			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
HRD	8578	2.196	CP	24	24	39	PRO	0	0	4.0	7	8	HC	5	9.05	1.94	0	NA	FG	9	2	2.59	11.26	11.60	3.5	11.1	3.9	2	0.60	0.26	-0.1	0.1	3.0	50			Y
PRD	6407	1.452	CP	36	36	48	PRO	0	5	3.4	3	3	MM_MM	5.30	9.4	2.9	0	N	CG	9.7	3.0	3.6	12.9	13.3	2.3	12.7	3.5	2	0.60	0.20	0.6	0.1	3.3	88			Y
SRD	7500	11.932	CP	48	48	38		0	0	3.5	3	3	MC	5	7.1	3.9	0		O_SC	7.2	4	5.19	11.25	12.4	9	11.15	10.1	2	1.20	0.05	0.3	0.1	2.5	114			Y
TRDN	2000000	90.201	CP	60	60	50		0	0	5.5	7	11	HC	5.8	12.80	5.0	0	N	LC	13.80	5	5.8	18.8	19.9	11.0	18.1	11.5	2	1.10	0.00	2.0	0.0	0.0	91			Y
TRDN	2085000	0.408	CP	18	18			0	0	2.2	12	7	HC1	5.7	10.20	1.5	0		O	11.10	1.5	2.2	12.9	13.0	1.9	12.7	2.2	2	0.40	0.30	####	0.0	0.0	68			Y
TRDN	2900000	4.849	CPB	72	72	44		0	0	9.7	16		HC2	5.6	7.20	5.9	0		B_B0	9.20	6.1	7.0	15.5	16.0	9.5	14.9	12.5	2	0.70	0.20	4.5	0.1	1.7	62			Y
TRDN	1525000	5.606	CP	48	48	40		0	0	3.0	3	3	MM1	5.7	10.50	4.4	0		CG	10.90	4.0	4.3	15.2	15.3	6.1	13.8	6.6	2	0.40	0.30	1.0	-0.4	-10.0	133			Y
TRDN	2000000	113.696	CP	24	24	40		0	0	2.6	2	2	MM1	5.6	9.40	2.0	0	NA	O	9.60	2.0	3.7	11.8	12.3	1.3	11.0	2.5	2	0.70	0.20	0.5	0.0	0.0	77			Y
TRDN	1400000	2.761	CP	48	48	36		0	0	5.9	2	4	MM1	5.40	7.20	4.0	0		FS_FG	7.30	4.0	4.2	11.3	11.7	15.2	10.7	17.0	2	0.40	0.00	0.3	0.0	0.0	68			Y
TRDN	1400000	2.877	PA	86	130	48		0	0	17.3	4	2	MM1	5.40	8.40	7.1	0		BR_LC	8.60	7.0	6.9	15.0	16.4	10.8	13.9	14.7	2	0.80	-0.60	0.4	0.1	0.9	63			Y
TRDN	1446000	1.542	CP	48	48	48		0	0	NA	0	7	NA	5.40	11.00	3.9	0		O	11.00	4.0	4.8	15.3	15.8	8.7	15.1	10.6	2	0.80	0.30	0.0	0.1	2.5	####			Y
TRDS	2000000	81.181	CP	18	18			0	0	NA	2	2	MM	5.8	10.30	1.5	0		O	11.00	1.5	2.4	12.8	13.00	0.4	12.4	2.5	2	0.50	0.30	####	0.0	0.0	####			Y
TRDS	3030400	0.220	CP	18	18	30	PRO	0		2.4	1	1	PA1	5.7	6.30	1.5	0		O	6.50	1.5	1.9	8.3	8.50	2.0	8.0	4.6	2	0.50	0.30	0.7	0.0	0.0	63			Y
SRD	7500	12.771	CP	24	24	43	PRO	0	0	6	6	6	MC	5	12	1.5	O		SC	15	2	2.2	16.6	17.2	6	18	6	2	0.20	-0.40	7.0	0.5	25.0	33			Y
PRD	6031	12.263	PA	76	114	44	MIT	0	0	8.4	6	13	HC_HC	5.37	8	5.5	100	CG	SC	8.7	6	6.2	15.2	15.8	15.0	15.2	25.0	2	1.10	0.50	1.6	0.8	13.2	113			Y
TRDN	2000000	89.894	AO	108	54	91		0	0	3.5	23	13	HC	5.8	18.50	5.5	100	BO_LC	B	31.80	5.5	5.7	37.9	38.1	3.6	36.8	8.1	2	0.80	0.60	14.6	3.5	38.9	129			Y
TRDN	1445310	0.166	CP	84	84	40		0	0	6.0	6	3	MM1	5.40	9.60	5.7	100	FG	CG	9.60	6.6	6.8	16.8	16.9	2.1	15.1	9.1	2	0.70	0.60	0.0	1.3	18.6	117			Y
TRDN	2087000	0.696	CP	48	48	40		0	0	8.4	3	1	PA1	5.7	8.40	3.9	100	O	O	9.50	3.5	3.3	9.8	11.3	8.7	9.1	9.8	2	-1.70	-3.20	2.8	0.1	2.5	48			Y
TRDS	2050000	4.310	CP	48	48	38	PRO	0		11.4	16	11	HC2	5.0	7.80	3.8	100	FG	LC	8.20	3.2	3.2	10.3	10.50	5.1	9.8	12.0	2	-0.90	-1.10	1.1	0.2	5.0	35			Y
TRDS	2060000	1.075	CP	36	36	36		0	0	3.8	1.5	2.0	MM1	5.5	9.30	1.7	100	SC_O	SC_CG	9.50	1.9	1.7	12.4	12.40	6.7	11.8	7.7	2	1.00	1.00	0.6	1.3	43.3	79			Y
PRD	6352	2.106	CP	72	72	52	PRO	0	0	11.2	7	9	MM_MM	4.95	10.20	5.7	60	SC	CG	10.30	6.0	7.7	19.60	19.40	13.2	18.22	22.8	2	3.10	3.30	0.2	0.3	5.0	54			Y
TRDS	3030000	18.410	CP	36	36	40	PRO	0		7.5	7	14	HC	5.4	8.00	3.0	60	CG	LC	8.90	2.0	24.0	10.7	10.90	2.9	10.1	12.0	2	0.00	-0.20	2.3	0.0	0.0	40			Y
TRDS	3000000	48.110	CP	36	36	30	PRO	0	5	4.3	11	4	MM1	5.4	7.15	2.6	60	CG	CG	7.25	2.6	4.1	10.4	10.46	3.9	9.5	7.5	2	0.59	0.52	0.3	0.4	12.5	70			Y
PRD	6358	2.450	CP	36	36	34	PRO	0	0	2.8	2	0	NT_PA	4.95	6.04	3.0	50	0	O	7.46	2.9	2.9	8.00	11.02	8.5	7.20	30.0	2	0.66	-2.36	4.2	0.0	0.0	107			Y
PRD	40000	2.956	CP	60	60	52	PRO	0	0	4.7	14	14	HC_HC	5.55	14.25	4.4	40	LC	SC_B	15.30	5.0	5.8	20.70	21.90	6.8	20.10	8.4	2	1.60	0.40	2.0	0.6	12.0	106			Y
PRD	6415	3.934	CP	24	24	32	PRO	0	25	5.30	13	4	HC_MM	5.55	7.1	2	40	SC_LC	SC_LG	8.15	1.8	1.9	9.55	9.75	3.3	9.05	6.7	2	-0.20	-0.40	3.3	0.0	0.0	38			Y
TRDN	2000000	108.153	CPB	60	60	120		0	0	6.6	14	10	HC2	5.6	16.30	3.4	20	LC	BO_LC	22.70	3.7	3.7	27.7	27.8	4.6	26.8	6.3	2	1.40	1.30	5.3	1.6	32.0	76			Y
PRD	6350	11.314	CP	18	18	30	PRO	0	0	2.6	2	1	FP_MM	4.95	7.76	1.4	20	CG	FS	9.22	1.5	1.5	10.50	11.20	6.8	10.00	8.4	2	0.48	-0.22	4.9	0.1	6.7	58			Y
PRD	40000	3.356	CP	96	96	40	PRO	0	0	19.0	5	8	HC_HC	5.55	9.72	8.2	20	SC	SC_LC	10.40	7.8	9.0	16.66	20.00	8.3	18.10	16.8	2	1.80	-1.54	1.7	-0.2	-2.5	42			Y
PRD	6352	1.956	CP	24	24	40	PRO	0	15	2.8	15	11	NT_NT	4.95	12.52	1.5	20	CG	CG	13.94	1.8	2.3	15.70	16.14	2.4	15.22	7.0	2	0.40	-0.04	3.6	0.5	25.0	71			Y
TRDS	2050000	4.640	CP	36	36	26	PRO	0		5.1	20	6	HC2	5.0	6.60	3.0	15	LC	LC	7.10	3.0	3.5		10.60	3.9	10.0	6.8	2	0.50	-10.10	1.9	0.0	0.0	59			Y
PRD	6402	6.017	CP	36	36	60	PRO	0	15	5.40	2	4	MM_MM	4.95	18.9	3.2	15	SC	FG	18.5	3.0	4.9	23.36	23.62	3.3	23.16	8.2	2	2.12	1.86	-0.6	-0.2	-6.7	56			Y
PRD	6350	14.806	CP	24	24	33	PRO	0	0	2.5	8	3	NT_PA	4.95	7.68	2.0	10	SC	LC_S	9.60	1.8	1.8	11.46	11.92	2.7	10.40	8.6	2	0.52	0.06	5.8	0.0	0.0	80			Y
PRD	6411	0.546	CP	36	36	30	PRO	0	0	2.8	3	4	MC_MC	5.37	8.58	3	5	N	LG	8.96	3	3.2	11.9	12.44	3	11.52	3.7	2	0.48	-0.06	1.3	0.0	0.0	107			Y
TRDS	2000000	76.527	PA	54	63	50		0	0	2.5	1	3	MM	5.8	13.00	4.6	3		O	13.80	5.0	5.4	19.3	19.55	2.3	18.8	5.0	2	0.75	0.50	1.6	-0.1	-2.2	210			Y
PRD	6327	0.842	CP	36	36	42	PRO	0	0	4.9	12	3	HC_MM	5.37	10.50	3.0	0	N	FG_S	14.60	3.0	3.0	17.9	18.7	2.9	17.6	3.3	2	1.10	0.30	9.8	0.0	0.0	61			Y
TRDN	1530000	1.976	CP	18	18	30		0	0	2.0	7	6	HC2	6.1	7.80	1.5	0		CG_FG	8.70	1.4	1.4	10.1	10.5	3.0	9.7	4.0	2	0.40	0.00	3.0	0.0	0.0	75			Y
TRDS	3015105	0.840	CP	24	24	31	PRO	0	0	2.0	7	12	HC2	5.0	6.90	2.0	0		CG_SC	7.10	1.9	3.2	11.3	11.40	2.7	11.2	3.3	2	2.40	2.30	0.6	0.0	0.0	100			Y
PRD	6317	5.841	CP	36	36	30	PRO	0	0	3.5	11	6	HC_HC	5.37	7.54	3.0	0	N	LC_SC	9.90	3.0	3.6	12.88	13.32	6.7	12.24	17.7	2	0.42	-0.02	7.9	0.0	0.0	86			Y
PRD	6326	3.898	CP	36	36	30	PRO	0	0	3.5	8	9	HC_HC	5.37	9.90	3.0	0	N	SC	11.50	3.0	3.6	14.7	15.2	6.0	14.7	7.4	2	0.70	0.20	5.3	0.0	0.0	86			Y
PRD	6328	0.510	CP	24	24	56	PRO	0	0	6.1	8	9	HC_HC	5.37	13.00	2.0	0	N	SC	14.15	2.0	2.2	16.1	16.3	4.0	16.1	5.0	2	0.15	-0.05	2.1	0.0	0.0	33			Y
PRD	6328	4.530	CP	24	24	40	PRO	0	0	4.8	11	10	HC_HC	5.37	11.25	2.0	0	N	SC	13.75	2.0	2.2	15.3	15.8	7.2	15.1	7.7	2	0.05	-0.45	6.3	0.0	0.0	42			Y
PRD	6352	6.830	CP	48	48	44	PRO	0	30	5.8	13	14	HC_HC	5.37	9.75	4	0.0	N	SC	12.05	4	5.1	16.2	16.5	4.8	15.9	6.9	2	0.45	0.15	5.2	0.0	0.0	69			Y
PRD	6402	20.639	CP	60	60	58	MIT	0	0	4.5	9	9	HC_HC	5.30	13.3	5	0	N	LC_B	15.7	5.0	5.5	20.6	21.4	6.8	20.3	6.8	2	0.70	-0.10	4.1	0.0	0.0	111			Y
PRD	6420	1.538	CP	48	48	40	PRO	0	0	1	5	12	HC_HC	5.30	8.08	4.2	0	0	LG	10.52	4.0	5.1	14.84	15.94	11	14.56	20.7	2	1.42	0.32	6.1	-0.2	-5.0	400			Y
PRD	6420	2.419	CP	60	60	44	PRO	0	0	4.4	6	9	HC_HC	5.30	7.82	5.1	0	0	SC	9.14	5.2	6.3	14.56	14.86	7.2	13.3	9.8	2	0.52	0.22	3.0	-0.1	-2.0	114			Y
PRD	6428	1.697	CP	60	60	40	PRO	0	0	4.5	2	7	HC_HC	5.30	8.64	5	0	0	LG_SC	9.26	5.0	7.4	17.06	16.72	2	15.24	10	2	2.46	2.80	1.6	0.0	0.0	111			Y
PRD	6428	5.139	CP	36	36	48		0	5	2.5	6	5	HC_HC	5.30	15.9	3.6	0	N	SC	16.28	3.0	4.95	21.12	21.92	1.5	20.76	6.95	2	2.64	1.84	0.8	-0.6	-20.0	120			Y
PRD	6436	0.162	CP	24	24	44	PRO	0	0	2.60	8	4	HC_HC	4.95	9.98	1.9	0	N	FG	10.32	2.0	4	14.16	14.26	3.6	13.54	6.7	2	1.94	1.84	0.8	0.1	5.0	77			Y
PRD	6319	10.379	CP	36	36	48	PRO	0	0	3.1	7	6	HC_MM	5.37	9.4	3	0	N	CG	12.75	3	4.5	15.9	16.1	6.3	15.2	12.4	2	0.35	0.15	7.0	0.0	0.0	97			Y
PRD	6235	15.785	CP	60	60	34	PRO	0	0	2.6	11	8	HC_NT	5.55	8.60	5.0	0	N	SC	8.40	5.0	5.7	14.30	14.55	4.4	12.80	5.8	2	1.15	0.90	-0.6	0.0	0.0	192			Y
PRD	6415	17.045	CP	18	18	40	PRO	0	0	2.40	3	12	MM_HC	4.95	9.76	1.5	0	N	S_ORG	10.94	1.5	2.1	12.58	13.22	2.8	11.9	4.9	2	0.78	0.14	3.0	0.0	0.0	63			Y
PRD	6326	0.909	CP	18	18	28	PRO	0	0	3.7	2	5	MM_MM	5.37	8.50	1.5	0	N	O	9.15	1.5	1.5	9.9	10.4	4.9	9.9	4.9	2	-0.25	-0.75	2.3	0.0	0.0	41			Y
PRD	6327	0.208	CP	24	24	52	PRO	0	0	2.7	5	2	MM_MM	5.37	15.95	2.0	0	N	FG_S	18.15	2.0	2.2	20.3	20.8	2.7	20.0	3.1	2	0.65	0.15	4.2	0.0	0.0	74			Y
PRD	6461	2.685	PA	48	72	40	PRO	0	0	4.8	3	4	MM_MM	5.30	7.4	4.2	0.0	N	SC	8.8	4.2	4.9	13.2	13.4	5.9	12.4	9.6	2	0.40	0.20	3.5	-0.2	-5.0	125			Y
PRD	6407	2.725	CP	18	18	30	PRO	0	0	2.50	4	0	MM_PA	5.55	6.3	1.6	0	N	CG_O	6.64	1.5	1.9	8.4	8.76	2.5	7.96	2.9	2	0.62	0.26	1.1	-0.1	-6.7	60			Y
PRD	6235	19.290	AR3	40	60	44	PRO	0	0	18.3	2	2	MM1_MM1	5.55	12.72	3.6	0	N	CG_SC	9.55	3.6	4.3	13.10	14.00	7.1	8.30	24.2	2	0.85	-0.05	-7.2	-0.3	-8.0	27			Y
PRD	6352	0.431	AR	72	96	44	PRO	0	0	7.5	1	45	PA_HC	4.95	7.64	6.1	0	N	0	7.66	6.4	7.9	14.70	15.72	5.2	12.85	14.3	2	1.66	0.64	0.0	-0.1	-1.7	107			Y
PRD	6416	0.290	CP	36	36	40		0	0	4	2	7	PA_HC	5.3	7.42	3	0	N	ORG_L	7.8	3.0	5.9	14.12	14.68	3.3	13.36	5.03	2	3.88	3.32	1.0	0.0	0.0	75			Y
PRD	6441	1.296	CP	24	24	24	PRO	0	0	6	3	4	PA_MM	5.30	6.4	2	0.0	N	SC	6.5	2.0	3.2	8.8	9.3	4.9	8.3	10.4	2	0.80	0.30	0.4	0.0	0.0	33			Y
PRD	6327	0.365	CP	24	24	50	PRO	0	Y	3.2	1	2	PA_PA	5.37	9.70	2.0	0	N	O	10.05	2.0	2.0	12.4	12.7	3.4	12.3	4.3	2	0.65	0.35	0.7	0.0	0.0	63			Y
PRD	6407	6.208	CP	24	24	30	PRO	0	0	3.80	5	7		5.55	6.62	2	0	N	O	7.04	1.8	2.6	9.14	9.26	9.08	1.2	4	2	0.42	0.30	1.4	0.0	0.0	53			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
SRD	7500	12.645	CP	24	24	27	PRO	0	0	5	5	5	MC	5	8.65	1.95	0		SC	10.92	2.24	2.38	12.8	13.3	4	11.9	4	2	0.14	-0.36	8.4	0.1	2.5	40			Y
SRD	7500	13.095	CP	18	18	27	PRO	0	0	1	1	1	SWAMP	5	6.82	1.66	0		O	7.2	1.7	2.05	8.9	9.45	8.15	8.61	9.4	2	0.55	0.00	1.4	-0.2	-10.7	150			Y
TRDN	2000000	116.584	CP	36	36	40		0	0	2.0	8	14	HC1	5.4	10.50	2.0	0	NA	O	8.50	2.0	3.1	16.7	17.4	1.6	16.3	2.8	2	6.90	6.20	-5.0	1.0	33.3	150			Y
TRDN	1435000	0.895	CP	72	72	62		0	0	4.0	16	17	HC2	5.40	8.00	6.0	0		LC	19.30	6.0	6.9	32.5	32.8	4.9	31.6	17.9	2	7.50	7.20	18.2	0.0	0.0	150			Y
TRDN	2000000	109.343	CP	36	36	76		0	0	2.0	11	14	HC2	5.6	17.05	3.1	0		CG_FG	25.60	3.0	4.2	30.1	30.1	2.5	29.2	3.5	2	1.50	1.50	11.3	-0.1	-3.3	150			Y
TRDN	2084015	0.215	CP	48	48	54		0	0	3.9	16	15	HC2	5.7	11.00	3.9	0		LC_CG	17.20	4.0	5.7	23.8	23.8	6.4	23.3	7.5	2	2.60	2.60	11.5	0.1	2.5	103			Y
TRDN	2720000	0.451	CP	36	36	40		0	15	6.0	9	8	HC2	6.0	5.90	3.0	0		LC_CG	7.50	3.0	3.8	10.7	11.0	7.9	10.7	8.2	2	0.50	0.20	4.0	0.0	0.0	50			Y
TRDN	1445310	1.237	CP	24	24			0	0	2.0	9	5	HCS	5.40	11.00	2.0	0		CG	12.70	2.0	3.2	15.5	15.6	6.6	15.1	9.6	2	0.90	0.80	####	0.0	0.0	100			Y
TRDN	2077000	0.297	CP	84	84	62		0	0	18.3	6	5	MC2	5.6	13.00	7.1	0		LC_B	15.15	7.0	7.3	18.9	19.5	20.7	18.1	23.8	2	-2.65	-3.25	3.5	-0.1	-1.4	38			Y
TRDN	2720000	0.213	CP	18	18	40		0	0	2.0	8	3	MM	6.0	7.10	1.5	0		O	7.60	1.5	2.3	9.0	9.7	3.8	8.7	5.6	2	0.60	-0.15	1.3	0.0	0.0	75			Y
TRDN	1525200	1.342	CP	36	36	32		0	0	2.3	4	3	MM1	5.7	7.40	3.0	0		FG_CG	8.80	3.0	3.2	12.0	12.7	3.9	11.6	3.8	2	0.90	0.20	4.4	0.0	0.0	130			Y
TRDN	1445310	0.849	CP	24	24	40		0	0	2.0	9	2	MM1	5.40	8.60	1.9	0		CG	8.10	2.0	2.3	11.5	12.0	1.4	10.7	3.2	2	1.90	1.40	-1.3	0.1	5.0	100			Y
TRDN	2900000	4.046	CP	24	24	30		0	0	2.4	4	12	MM1	5.6	8.35	2.0	0		FG_CG	9.40	2.0	2.2	11.6	12.1	5.2	11.6	5.2	2	0.70	0.20	3.5	0.0	0.0	83			Y
TRDN	2000860	0.659	CP	36	36	32		0	0	6.5	4	6	MM1	5.7	6.80	3.2	0		CG_SC	7.00	3.0	3.8	10.3	10.5	9.4	9.6	11.2	2	0.50	0.30	0.6	-0.2	-6.7	46			Y
TRDN	1500000	2.356	CP	72	72	44		0	10	25.3	1	1	PA1	5.6	8.23	6.1	0		S	8.40	6.1	6.4	14.5	16.5	13.8	12.7	23.4	2	2.00	0.00	0.4	-0.1	-1.7	24			Y
TRDN	2900000	3.871	CP	24	24	30		0	0	2.8	10	2	PA5	5.6	9.00	2.0	0		O	9.60	2.0	2.5	11.7	12.1	2.9	11.6	5.4	2	0.50	0.10	2.0	0.0	0.0	71			Y
TRDS	2000644	0.030	CP	24	24	30	PRO	0		2.6	10	13	HC2	5.7	18.60	2.0	0		CG	9.90	2.0	2.3	15.7	16.10	4.1	15.1	4.5	2	4.20	3.80	-29.0	0.0	0.0	77			Y
TRDS	3030100	0.360	CP	48	48	40	PRO	0		3.0	6	13	HC2	5.5	10.83	4.1	0		SC	12.62	4.0	4.6	16.6	17.03	4.6	16.0	10.3	2	0.41	0.01	4.5	-0.1	-2.5	133			Y
TRDS	3017400	0.060	PP	18	18		PRO	0	0	3.3	10	7	HC2	5.0	6.75	1.5	0		CG_O	9.30	1.5	2.1	12.1	12.50	5.1	11.5	6.9	2	1.70	1.30	####	0.0	0.0	45			Y
TRDS	2000000	77.608	CP	60	60	40		0	0	NA	2	6	MM	5.8	10.30	4.2	0		S	10.50	5.0	6.1	16.2	15.90	1.1	15.8	3.3	2	0.40	0.70	0.5	0.8	16.0	####			Y
TRDS	3030100	0.120	CP	18	18		PRO	0		1.5	4	4	MM	5.5	6.53	1.5	0		CG	8.11	1.6	2.1	10.0	10.08	2.7	9.6	7.8	2	0.37	0.32	####	0.0	0.0	100			Y
TRDS	2000644	0.230	CP	18	18	30	PRO	0		1.6	2	10	MM1	5.7	7.20	1.5	0		O	7.20	1.5	2.0	10.1	10.20	1.7	9.5	3.8	2	1.50	1.40	0.0	0.0	0.0	94			Y
TRDS	3015600	3.110	CP	24	24		PRO	0	0	2.6	3	11	MM1	5.6	7.30	2.0	0		S_CG	7.30	1.9	2.6	9.7	9.80	3.1	9.3	6.4	2	0.60	0.50	####	0.0	0.0	77			Y
TRDS	2000648	0.530	CP	24	24	38	PRO	0		4.3	4	5	MM1	5.7	8.80	2.0	0		FG	8.60	2.0	3.3	10.9	11.70	4.9	10.6	5.6	2	1.10	0.30	-0.5	0.0	0.0	47			Y
TRDS	2058000	1.420	CP	48	48	40	PRO	0		1.9	2	3	MM1	5.6	9.00	4.2	0		CG	9.95	3.5	3.8	13.6	14.10	2.1	13.2	4.8	2	0.65	0.15	2.4	-0.2	-5.0	211			Y
TRDS	3030100	1.530	CP	24	24	30	PRO	0		2.5	6	4	MM1	5.7	8.00	2.0	0		O	7.90	2.0	2.8	10.7	10.90	3.9	10.4	4.3	2	1.00	0.80	-0.3	0.0	0.0	80			Y
TRDS	3030300	0.780	CP	36	36	30	PRO	0		2.4	1	1	PA1	5.7	6.80	3.1	0		O	6.90	3.0	4.1	10.6	11.00	7.0	10.0	8.6	2	1.10	0.70	0.3	-0.1	-3.3	125			Y
TRDS	2057000	2.090	CP	24	24	40	PRO	0		1.9	7	12		5.0	7.60	1.9	0		SC	12.20	2.0	2.4	14.4	106.00	4.2	14.2	5.9	2	91.80	0.20	11.5	0.1	5.0	105			Y
WRD	6265	2.899	cp	48	48	32		0	5	6.3	19	12	hc	4.75	4.75	4	0	0	lc	9.65	4	4.6	13.7	14.3	5.6	12.9	7.1	2	0.65	0.05	15.3	0.0	0.0	63			Y
WRD	6265	1.568	cp	36	36	40		0	0	7.8	30	29	hc	4.75	6.75	2.15	0	0	lc	16.15	3	2.8	18.2	19	5.1	17.5	7	2	-0.15	-0.95	23.5	0.9	28.3	38			Y
WRD	52031	0.247	CP	48	48	30		0	0	8.4	4	6	HC	5.00	6.20	3.9	0		SC	6.65	4.0	4.1	9.90	10.45	9.3	9.50	13.1	2	-0.20	-0.75	1.5	0.1	2.5	48			Y
WRD	6590	14.085	PA	88	144	59	STB	0	999	20.6	5	6	MC	5.00	12.90	7.6	0		LC_BO	15.80	7.3	8.0	23.00	24.80	16.6	21.40	19.8	2	1.70	-0.10	4.9	-0.3	-3.6	58			Y
WRD	52031	0.463	CP	24	24	28		0	0	2	5	13	MM	5.00	6.60	2.8	0		S	6.80	2.0	3.0	10.30	10.60	1.8	9.50	4.0	2	1.80	1.50	0.7	-0.8	-40.0	100			Y
WRD	52031	0.615	CP	24	24	30		0	5	8	6	2	MM	5.00	5.60	2.5	0		S	6.90	2.0	2.6	8.85	9.20	2.5	8.70	2.8	2	0.30	-0.05	4.3	-0.5	-25.0	25			Y
TRDN	2084000	0.670	CP	18	18			0	0	1.0	18	15	HC2	5.7	6.50	1.6			CG_SC	9.50	1.5	2.0	12.7	12.7	1.6	12.4	2.9	2	1.70	1.70	####	-0.1	-6.7	150			Y
TRDN	3000000B	89.221	CP	48	48	60		0	0	3.4	3	4	MM1	5.8	16.00	2.6				17.00	3.7	3.65	20.7	20.5	6.0	20.0	6.9	2	-0.20	0.00	1.7	1.4	35.0	118			Y
PRD	6402	9.614	CP	24	24	30	PRO	0	20	1.00	13	11	HC_HC	4.95	6.18	1.5	100	CG	O	7.1	1.6	1.3	9.12	9.36	2.9	8.9	5.5	2	0.66	0.42	3.1	0.5	25.0	200			Y
TRDS	3015600	0.950	CP	36	36	46	PRO	0	0	4.7	5	2	MM1	5.5	8.80	3.0	100	CG	CG_SC	9.30	2.4	2.4	12.2	12.30	4.0	11.8	4.6	2	0.60	0.50	1.1	0.0	0.0	64			Y
PRD	6425	0.207	CP	48	48	34	PRO	0	10	4.8	4	6	HC_HC	4.75	9.12	2.9	90	LC	SC_O	10.22	2.9	3.0	16.24	16.54	2.20	15.8	4.5	2	3.42	3.12	3.2	1.1	27.5	83			Y
PRD	6402	18.604	CP	48	48	38	PRO	0	0	3.5	5	4	MM_MM	5.30	7.6	4	75	CG	CG	8.4	3.6	3.8	13	13.3	6.3	12.9	7	2	1.30	1.00	2.1	0.0	0.0	114			Y
PRD	6040	15.221	CP	36	36	39	PRO	0	0	5.4	9	7	HC_HC	5.37	10.40	3.0	40	SC	SC	10.85	3.0	7.4	17.6	18.5	5.6	17.1	7.1	2	4.65	3.75	1.2	0.0	0.0	56			Y
TRDS	2000000	71.333	CP	36	36	36		0	0	3.5	4	35	HC	5.8	8.60	2.5	40	CG	SC	9.10	3.0	4.3	15.6	16.00	4.3	14.6	6.2	2	3.90	3.50	1.4	0.5	16.7	86			Y
TRDS	3030000	18.800	CP	24	24	38	PRO	0		2.1	7	12	HC	5.4	11.60	2.0	30	LG	O	12.80	1.8	1.9	18.0	18.30	1.2	17.6	3.2	2	3.70	3.40	3.2	0.0	0.0	95			Y
TRDN	1530000	1.348	CP	24	24	40		0	0	3.4	8	9	HC2	6.1	12.20	1.8	15	SC	CG_FG	12.90	1.9	3.1	15.4	15.7	3.7	15.2	4.8	2	0.90	0.60	1.8	0.2	10.0	59			Y
HRD	8578	3.218	CP	24	24	40	PRO	0	0	2.5	10	15	HC	5	13.2	1.71	10	SC	CG	14.5	2	2.6	19.05	19.15	6	17.46	6.8	2	2.65	2.55	3.3	0.3	14.5	80			Y
PRD	6032	1.289	CP	60	60	69	PRO	0	0	6.5	12	13	HC_HC	5.37	9.9	4.6	10	LC	LC	12.8	5	5.4	24.5	24.8	8.1	23.8	12.9	2	7.00	6.70	4.2	0.4	8.0	77			Y
PRD	6319	10.975	CP	36	36	34	PRO	0	0	2.6	8	8	HC_HC	5.37	8.05	3	10	SC	SC	8.65	3	4.1	12	12.6	3.8	11.5	7.3	2	0.95	0.35	1.8	0.0	0.0	115			Y
TRDN	1430315	0.254	CP	36	36	40		0	0	3.2	7	9	HC1	5.40	12.20	3.0	10	SC	SC_LG	13.10	3.0	4.1	16.7	16.8	4.8	16.2	7.7	2	0.70	0.60	2.3	0.0	0.0	94			Y
TRDN	2000000	118.976	CP	24	24	70		0	0	2.6	5	17	MM1	5.4	9.30	2.0	10	CG	FG	14.90	1.7	1.8	17.1	17.6	1.3	16.3	3.5	2	1.00	0.50	8.0	0.0	0.0	77			Y
TRDN	2000000	111.321	CP	36	36	40		0	0	4.3	6	6	MM1	5.6	9.00	2.8	5	CG	SC_CG	9.55	2.8	2.8	13.0	13.1	3.4	12.5	4.7	2	0.75	0.65	1.4	0.2	6.7	70			Y
TRDN	1525200	0.991	CP	36	36	42		0	0	3.7	6	8	HC2	5.7	11.20	3.0	5	SC	CG_SC	12.30	3.0	5.0	19.0	19.2	5.1	18.7	5.7	2	3.90	3.70	2.6	0.0	0.0	81			Y
TRDS	3000000	49.660	CP	24	24	30	PRO	0		1.8	1	3	HC2	5.4	6.89	2.0	5	SC		7.38	2.0	3.0	9.9	10.23	2.6	9.6	6.6	2	0.89	0.56	1.6	0.0	1.6	111			Y
TRDS	2000000	77.820	CP	60	60	40		0	0	2.0	3	3	MM	5.8	10.85	5.0	3	SC	O	11.80	5.0	5.2	18.9	18.80	1.7	18.3	4.9	2	2.00	2.10	2.4	0.0	0.0	250			Y
TRDN	2085000	0.646	CP	18	18	36		0	0	2.9	10	7	HC2	5.7	7.20	1.5	0		CG_SC	8.30	1.3	1.4	10.0	10.1	1.6	9.3	4.2	2	0.50	0.40	3.1	0.0	0.0	52			Y
TRDN	1525200	0.870	CP	24	24	28		0	10	4.1	4	2	MM1	5.7	7.70	2.0	0		O_SC	7.70	2.0	3.2	11.6	12.0	6.3	11.3	6.5	2	2.30	1.90	0.0	0.0	0.0	49			Y
TRDN	1445000	3.302	CP	18	18	31		0	35	2.0	9	8	N	5.4	9.40	0.9	0		O	11.30	1.3	1.6	13.7	14.0	1.5	13.6	1.6	2	1.40	1.10	6.1	0.6	40.0	75			Y
TRDS	2054000	7.310	pp	24	24	40		0	0	2.0	8	17	hc1	5.0	8.65	2.1	0		o_cg	13.15	2.0	2.5	17.8	18.30	2.7	17.4	5.8	2	3.15	2.65	11.3	-0.1	-5.0	100			Y
TRDS	3015105	0.910	CP	36	36	40	PRO	0	0	3.2	17	16	HC5	5.6	11.10	3.1	0		CG_SC	12.55	3.0	4.6	19.6	19.70	5.2	18.9	8.6	2	4.15	4.05	3.6	-0.1	-3.3	94			Y
TRDS	3015600	0.210	CP	24	24	41	PRO	0	20	2.9	3	4	MM1	5.6	10.30	1.8	0		CG_FG	11.50	2.0	2.3	14.3	14.40	1.5	13.7	3.6	2	0.90	0.80	2.9	0.2	10.0	69			Y
TRDS	2050300	2.850	CP	24	24	31	PRO	0		3.2	3	13	MM1	5.6	9.70	2.0	0	CG	CG	10.35	2.0		13.3	13.50	4.9	13.1	6.2	2	1.15	0.95	2.1	0.0	0.0	63			Y
HRD	8578	3.168	CP	24	24	38	PRO	0	0	1.5	8	15	HC	5	10.1	1.66	0	NA	CG	12.37	2	2.6	15.24	16.25	3	15.87	3.5	2	1.88	0.87	6.0	0.3	17.0	133			Y
HRD	8578	3.532	CP	36	36	40	PRO	0	0	2.9	15	13	HC	5	12.3	3.5	0	NA	CG	14.5	3	3.1	18.12	18.50	5.5	17.5	7	2	1.00	0.62	5.5	-0.5	-16.7	103			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
HRD	8578	0.608	CP	24	24	34	PRO	0	0	2.5	6	16	HC2	5	5.31	1.94	0	NA	CG	8.55	2	2	12.7	12.90	3.5	12.49	4.5	2	2.35	2.15	9.5	0.1	3.0	80			Y
HRD	8578	2.906	CP	48	48	40	PRO	0	0	6.0	8	12	HC2	5	8.3	3.7	0	NA	SC	11.8	4	5.2	17.9	18.10	7.6	17.4	8.6	2	2.30	2.10	8.8	0.3	7.5	67			Y
HRD	8578	3.764	CP	36	36	34	PRO	0	0	4.0	8	4	MM	5	9.65	3.1	0	NA	CG	12.11	3	3.5	15.6	16.03	6.5	15.52	7.5	2	0.92	0.49	7.2	-0.1	-3.3	75			Y
PRD	40000	3.129	CP	24	24	40	PRO	0	0	1.8	6	6	AF_AF	5.55	9.40	2.4	0	N	FG	9.85	2.0	3.5	13.20	14.30	4.5	11.80	11.6	2	2.45	1.35	1.1	-0.4	-20.0	111			Y
PRD	6204	6.092	CP	36	36	35	PRO	0	0	3.6	6	11	AF_HC	5.55	8.66	3.0	0	N	S_LC	9.74	3.0	5.6	14.70	15.70	5.0	13.66	15.0	2	2.96	1.96	3.1	0.0	0.0	83			Y
PRD	6235	0.740	CP	24	24	38	PRO	0	0	3.1	17	7	HC_AF2	5.55	9.90	2.0	0	N	FG	14.50	2.0	3.2	16.90	17.40	3.7	16.00	6.4	2	0.90	0.40	12.1	0.0	0.0	65			Y
PRD	6031	11.707	CP	36	36	46	PRO	0	0	4.2	10	18	HC_HC	5.37	11.2	3	0	N	CG	14.6	3	4.4	18.1	18.7	4.3	18.1	9.1	2	1.10	0.50	7.5	0.0	0.0	71			Y
PRD	6204	3.579	CP	60	60	40	PRO	0	0	5.2	9	12	HC_HC	5.55	7.51	5.0	0	N	LC_SC	9.76	5.0	5.1	15.26	15.11	2.5	14.61	2.6	2	0.35	0.50	5.6	0.0	0.0	96			Y
PRD	6204	4.476	CP	36	36	50	PRO	0	0	4.9	8	9	HC_HC	5.55	13.21	3.0	0	N	LC_SC	16.81	3.0	3.5	23.21	23.56	3.7	22.76	5.8	2	3.75	3.40	7.2	0.0	0.0	61			Y
PRD	6212	0.106	CP	72	72	30	PRO	0	0	8.6	9	10	HC_HC	5.37	7.80	6.0	0	0	SC	8.80	6.0	7.3	16.90	17.40	9.5	13.40	13.4	2	2.60	2.10	3.3	0.0	0.0	70			Y
PRD	6212	0.753	CP	36	36	30	PRO	0	0	4.3	8	11	HC_HC	5.37	8.30	3.0	0	N	FG_S	10.50	3.0	4.2	19.00	19.30	4.1	18.50	5.3	2	5.80	5.50	7.3	0.0	0.0	70			Y
PRD	6235	1.209	CP	48	48	48	PRO	0	0	5.8	13	14	HC_HC	5.55	8.72	3.8	0	N	SC	11.40	4.0	4.7	18.56	19.57	5.7	18.20	14.6	2	4.17	3.16	5.6	0.2	5.0	69			Y
PRD	6235	12.932	CP	36	36	72	PRO	0	0	2.5	4	7	HC_HC	3.25	16.20	3.0	0	N	S	19.60	3.1	4.6	24.40	25.00	3.3	23.70	4.1	2	2.30	1.70	4.7	0.0	0.0	120			Y
PRD	6241	4.155	CP	36	36	40	PRO	0	0	6.2	13	13	HC_HC	5.55	11.97	3.2	0	N	LC_S	14.00	3.0	3.4	16.80	18.50	11.1	16.50	15.9	2	1.50	-0.20	5.1	-0.2	-6.7	48			Y
PRD	6245	1.256	CP	36	36	50	PRO	0	0	2.7	7	14	HC_HC	5.55	12.00	3.7	0	N	O	14.30	3.0	5.1	19.88	20.10	1.3	19.40	6.0	2	2.80	2.58	4.6	-0.7	-23.3	111			Y
PRD	6245	1.503	CP	36	36	40	PRO	0	0	4.4	9	5	HC_HC	5.55	11.00	3.0	0	N	SC_LC	12.40	3.0	4.9	17.32	18.00	10.6	16.40	20.3	2	2.60	1.92	3.5	0.0	0.0	68			Y
PRD	6245	1.505	CP	36	36	40	PRO	0	0	4.4	9	5	HC_HC	5.55	11.60	3.0	0	N	SC_LC	12.10	3.0	4.5	17.32	18.00	10.6	16.40	20.3	2	2.90	2.22	1.3	0.0	0.0	68			Y
PRD	6317	4.717	CP	24	24	30	PRO	0	0	3.0	12	7	HC_HC	5.37	10.36	1.9	0	N	SC	13.72	2.0	2.4	16.62	17.36	4.5	15.90	6.7	2	1.64	0.90	11.2	0.1	5.0	67			Y
PRD	6317	5.699	CP	24	24	30	PRO	0	0	2.3	9	9	HC_HC	5.37	7.42	2.0	0	N	SC	9.16	2.0	4.6	12.44	13.06	3.4	11.92	6.5	2	1.90	1.28	5.8	0.0	0.0	87			Y
PRD	6319	7.383	CP	24	24	24	PRO	0	0	1.9	24	13	HC_HC	5.37	6.1	2	0	N	CG	6.9	1.6	2	10.2	11.1	3.0	9.5	6.0	2	2.60	1.70	3.3	0.0	0.0	105			Y
PRD	6319	7.642	CP	48	48	48	PRO	0	0	6.3	9	13	HC_HC	5.37	12.3	4	0	N	CG	16.9	4	6.2	22.9	23.3	8.4	22.5	10.5	2	2.40	2.00	9.7	0.0	0.0	63			Y
PRD	6319	8.709	CP	36	36	30	PRO	0	0	3	8	10	HC_HC	5.37	6.75	3	0	N	CG	8.45	3	4.5	12.6	13	3.0	12	4.2	2	1.55	1.15	5.7	0.0	0.0	100			Y
PRD	6323	5.294	CP	48	48	36	PRO	0	0	5.3	15	20	HC_HC	5.37	10.5	4	0	N	SC	14.35	4	7	25.3	26.3	9.0	24.2	16.5	2	7.95	6.95	10.8	0.0	0.0	75			Y
PRD	6350	1.146	CP	48	48	40	PRO	0	0	2.3	50	22	HC_HC	4.95	9.50	3.9	0	N	B	14.08	4.0	5.5	20.12	20.20	1.8	19.62	4.2	2	2.12	2.04	11.5	0.1	2.5	174			Y
PRD	6350	11.746	CP	60	60	40	PRO	0	0	8.5	18	10	HC_HC	4.95	6.64	5.1	0	N	SC_SB	10.20	5.1	6.2	16.28	16.54	2.3	15.24	8.9	2	1.24	0.98	8.9	-0.1	-2.0	59			Y
PRD	6350	14.070	CP	60	60	55	PRO	0	0	6.0	12	10	HC_HC	4.95	7.50	5.0	0	N	LC	13.40	5.0	6.9	19.80	20.04	5.8	18.84	15.4	2	1.64	1.40	10.7	0.0	0.0	83			Y
PRD	6350	15.768	CP	36	36	40	PRO	0	0	2.8	18	8	HC_HC	4.95	8.94	3.0	0	N	FG_CG	12.76	3.0	4.2	17.06	17.70	3.5	15.84	8.2	2	1.94	1.30	9.6	0.0	0.0	107			Y
PRD	6357	0.140	CP	36	36	33	PRO	0	0	6.4	13	9	HC_HC	5.37	7.4	3	0.0	N	SC_LC	10.6	3	3.4	13.9	14.6	5.8	13.6	6.3	2	1.00	0.30	9.7	0.0	0.0	47			Y
PRD	6358	0.726	CP	36	36	41	PRO	0	10	3.9	17	11	HC_HC	4.95	9.00	3.1	0	N	LC	13.14	2.7	3.2	16.24	16.36	1.5	15.54	5.8	2	0.52	0.40	10.1	-0.1	-3.3	77			Y
PRD	6358	1.135	CP	48	48	52	PRO	0	0	3.3	19	20	HC_HC	4.95	9.54	3.0	0	N	B_SC	15.06	4.0	5.8	19.96	20.30	4.3	19.12	11.3	2	1.24	0.90	10.6	1.0	25.0	121			Y
PRD	6367	0.853	CP	24	24	40	PRO	0	0	2.1	10	23	HC_HC	5.37	9.85	2.0	0	N	SC	11.50	2.0	3.3	16.6	17.0	2.5	16.6	6.0	2	3.50	3.10	4.1	0.0	0.0	95			Y
PRD	6402	2.215	CP	36	36	30	PRO	0	0	4.20	12	8	HC_HC	4.95	5.88	3	0	N	FG	6.92	3.0	3.3	11.66	11.72	3.4	10.68	6.2	2	1.80	1.74	3.5	0.0	0.0	71			Y
PRD	6402	9.862	CP	24	24	40	PRO	0	25	2.30	9	14	HC_HC	4.95	6.84	1.6	0	N	CG	10.4	2.0	4	14.4	14.5	4.5	13.88	5.1	2	2.10	2.00	8.9	0.4	20.0	87			Y
PRD	6402	11.170	CP	36	36	64	PRO	0	0	5.20	4	10	HC_HC	4.95	7.8	2.8	0	N	CG	9.04	3.0	4.9	13.58	14.38	6.1	13.44	6.7	2	2.34	1.54	1.9	0.2	6.7	58			Y
PRD	6402	11.523	CP	48	48	40	PRO	0	0	7.00	7	7	HC_HC	4.95	7.68	4	0	N	LC	11.6	4.0	4.4	17.16	17.66	14.9	16.64	16.9	2	2.06	1.56	9.8	0.0	0.0	57			Y
PRD	6407	1.161	CP	48	48	81	PRO	0	0	4.8	22	12	HC_HC	5.30	15.4	4	0	N	CG	25.7	4.0	5.6	34.9	35.2	7	34.1	9.4	2	5.50	5.20	12.7	0.0	0.0	83			Y
PRD	6407	1.198	CP	48	48	100	PRO	0	75	11	8	6	HC_HC	5.30	21.9	4	0	N	LC	32.7	3.9	4.8	36.7	37.3	5	35.7	12.5	2	0.70	0.10	10.8	0.0	0.0	36			Y
PRD	6415	0.833	CP2	48	48	40	PRO	0	0	5.30	5	8	HC_HC	5.55	12.1	4	0	N	CG_FG	14.1	4.0	4.6	18.5	18.8	7.7	17.8	12.9	2	0.70	0.40	5.0	0.0	0.0	75			Y
PRD	6415	0.835	CP2	48	48	40	PRO	0	0	5.30	5	8	HC_HC	5.55	11.6	4	0	N	CG_FG	14.2	3.9	4.5	18.5	18.8	7.7	17.8	12.9	2	0.70	0.40	6.5	0.0	0.0	75			Y
PRD	6415	1.008	CP2	48	48	40	PRO	0	0	3.20	8	6	HC_HC	5.55	6.95	4	0	N	CG_LC	9.25	4.0	5.3	15.05	15.4	10.6	14.6	12.7	2	2.15	1.80	5.8	0.0	0.0	125			Y
PRD	6415	2.118	CP2	48	48	50	PRO	0	0	3.50	9	7	HC_HC	5.55	8.75	3.5	0	N	CG_BO	12.1	4.0	5.2	17.05	17.3	4.2	16.6	6.2	2	1.20	0.95	6.7	0.5	12.5	114			Y
PRD	6415	3.450	CP	24	24	40	PRO	0	10	2.40	9	13	HC_HC	5.55	7.75	1.7	0	N	FG	9.3	2.0	2.7	11.9	12.05	1.2	11.6	1.2	2	0.75	0.60	3.9	0.3	15.0	83			Y
PRD	6415	4.483	CP3	18	18	48	PRO	0	0	1.20	7	8	HC_HC	5.55	9.35	1.6	0	N	O	11.3	1.6	2.7	14.1	14.1	1.3	13.9	2.8	2	1.20	1.20	4.1	-0.1	-6.7	125			Y
PRD	6415	6.117	CP2	48	48	88	PRO	0	5	5.20	12	11	HC_HC	5.55	22.1	3.8	0	N	BO_LC	29.45	4.0	4.8	34.75	34.95	8.3	34.3	9.8	2	1.50	1.30	8.4	0.2	5.0	77			Y
PRD	6415	6.349	CP	48	48	58	PRO	0	0	3.60	7	14	HC_HC	5.55	14.9	4	0	N	BO_LC	19.05	4.0	5.1	26.52	27.12	6.9	25.77	10.7	2	4.07	3.47	7.2	0.0	0.0	111			Y
PRD	6415	7.198	CP	60	60	48	PRO	0	0	6.70	5	7	HC_HC	5.55	6.15	5.1	0	N	LC_CG	8.3	5.1	5.8	14.75	14.95	16.6	14.6	19.2	2	1.55	1.35	4.5	-0.1	-2.0	75			Y
PRD	6415	7.280	PA	48	60	50	PRO	0	0	3.60	6	10	HC_HC	4.95	6.28	4	0	N	CG_LC	8.3	4.1	5	13.48	14	4.5	12.18	13.5	2	1.60	1.08	4.0	0.0	0.0	139			Y
PRD	6420	1.081	CP	48	48	60		0	10	3.5	10	4	HC_HC	5.30	15	4.2	0	0	LG_SC	18.4	4.0	6.8	24	24.26	5.9	23.94	8	2	1.86	1.60	5.7	-0.2	-5.0	114			Y
PRD	40000	3.337	CP	60	60	52	PRO	0	0	7.2	11	6	HC_HC	5.55	8.05	4.9	0	N	SC	9.90	5.0	6.0	15.50	16.20	5.4	14.90	7.5	2	1.30	0.60	3.6	0.1	2.0	69			Y
PRD	46041	0.864	CP	48	48	36	PRO	0	0	2.5	6	7	HC_HC	5.30	10.2	4.1	0	N	LG_SC	12.96	4.0	6.3	20.44	20.7	2.1	20.16	9.1	2	3.74	3.48	7.6	-0.1	-2.5	160			Y
PRD	6402	19.492	CP	48	48	50	PRO	0	0	6.3	8	10	HC_-HC	5.30	9.4	4	0	N	SC	11.3	4.0	5	18.75	19.2	7.4	18.1	11.7	2	3.90	3.45	3.8	0.0	0.0	63			Y
PRD	6030	0.512	CP	48	48	66	PRO	0	0	6.4	6	3	HC_MC	5.37	15.45	4.0	0	N	CG	16.35	4.0	5.2	20.7	21.0	7.3	20.1	9.8	2	0.65	0.35	1.4	0.0	0.0	63			Y
PRD	6319	7.778	CP	36	36	34	PRO	0	0	2.1	8	7	HC_MM	5.37	8.05	3	0	N	CG	10.2	3	4	14.5	14.7	6.2	14	11.0	2	1.50	1.30	6.3	0.0	0.0	143			Y
PRD	6415	3.740	CP	36	36	30	PRO	0	5	2.60	7	3	HC_MM	5.55	6.3	2.9	0	N	LC	7.7	3.0	5	11.7	11.85	3.9	11.05	5.8	2	1.15	1.00	4.7	0.1	3.3	115			Y
PRD	6420	1.886	CP	48	48	40		0	0	5	12	7	HC_MM	5.30	7.28	4.05	0	0	SC	10.36	4.2	6	18.3	18.64	10.9	18.12	14.6	2	4.08	3.74	7.7	0.0	-1.3	80			Y
PRD	6420	1.914	CP	24	24	44	PRO	0	0	3.5	8	1J0	HC_MM	5.30	10.4	2	0	0	LG_SC	12.74	2.0	3.2	15.48	16.14	4.3	15.22	17.2	2	1.40	0.74	5.4	0.0	0.0	57			Y
PRD	40000	3.194	CP	48	48	50	PRO	0	0	5.9	13	3	HC_MM	5.55	13.16	3.6	0	N	SC_SB	15.60	3.7	4.3	19.70	20.40	5.3	18.60	11.8	2	1.10	0.40	4.9	0.4	10.0	68			Y
PRD	6367	0.742	CP	36	36	40	PRO	0	0	4.6	5	9	MC_HC	5.37	9.75	2.6	0	N	CG	11.35	3.0	5.1	16.6	17.3	4.6	15.9	5.3	2	2.95	2.25	4.0	0.4	13.3	65			Y
PRD	45601	1.961	CP	36	36	36	PRO	0	0	3.6	7	9	MC_HC	5.37	7.85	3.0	0	N	CS	8.55	3.0	3.6	12.6	12.9	6.1	12.5	6.6	2	1.35	1.05	1.9	0.0	0.0	83			Y
PRD	6040	14.771	CP	48	48	42	PRO	0	0	5.2	7	4	MC_MC	5.37	8.70	4.0	0	0	SC	10.40	4.0	4.5	15	15.2	4.8	14.5	7.6	2	0.80	0.60	4.0	0.0	0.0	77			Y
PRD	6407	0.117	CP2	48	48	38	PRO	0	0	8	4	6	MC_MC	5.30	9.6	4	0	N	LC	10.8	4.1	5.5	15.1	15.7	8.9	14.8	16.7	2	0.80	0.20	3.2	0.0	0.0	50			Y
PRD	6407	0.119	CP2	48	48	38	PRO	0	10	8	4	6	MC_MC	5.30	9.3	4	0	N	LC	10.8	4.0	4.5	15.1	15.7	8.9	14.8	16.7	2	0.90	0.30	3.9	0.0	0.0	50			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WS	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
PRD	45601	2.095	CP	18	18	28	PRO	0	0	2.4	7	4	MC_MC	5.37	7.20	1.5	0	N	O_FS	8.05	1.5	2.4	10.1	10.6	5.9	9.8	11.2	2	1.05	0.55	3.0	0.0	0.0	63			Y
PRD	6212	0.708	CP	60	60	30	PRO	0	0	7.9	6	8	MM_HC	5.37	12.50	5.0	0	N	CG_FG	14.75	5.0	10.1	23.80	24.30	8.3	23.10	14.2	2	4.55	4.05	7.5	0.0	0.0	63			Y
PRD	6415	4.223	CP	36	36	40	PRO	0	0	5.60	4	4	MM_HC	5.55	6.55	3	0	N	CG	7.55	3.0	4.5	10.9	11.1	6.3	10.45	8.7	2	0.55	0.35	2.5	0.0	0.0	54			Y
PRD	6235	19.287	CP3	48	48	48	PRO	0	55	18.3	2	2	MM_MM	5.55	7.90	4.0	0	N	CG_SC	9.10	3.9	3.9	13.10	14.00	7.1	8.30	24.2	2	1.00	0.10	2.5	0.0	0.0	22			Y
PRD	6319	8.413	CP	36	36	32	PRO	0	0	4.7	8	6	MM_MM	5.37	7	3	0	N	CG	7.9	3	4.8	12.1	12.6	5.1	11.1	8.2	2	1.70	1.20	2.8	0.0	0.0	64			Y
PRD	6350	8.482	CP	24	24	32	PRO	0	0	2.3	4	5	MM_MM	4.95	6.88	1.5	0	N	FG	8.56	1.5	2.9	11.44	11.74	2.4	11.14	3.7	2	1.68	1.38	5.3	0.5	25.0	87			Y
PRD	6367	0.657	PA	48	75	42	PRO	0	0	5.9	3	5	MM_MM	5.37	9.25	4.0	0	N	CG	10.70	4.0	5.3	15.6	16.1	5.8	15.0	9.3	2	1.40	0.90	3.5	0.0	0.0	106			Y
PRD	6402	7.872	CP	48	48	40	PRO	0	5	7.90	1	1	MM_MM	4.95	8.96	3.9	0	N	LC_CG	9.82	4.0	4	14.18	14.18	7.3	12.52	8	2	0.36	0.36	2.2	0.1	2.5	51			Y
PRD	6402	15.797	CP	36	36	36	PRO	0	0	6.6	4	7	MM_MM	5.30	8.72	3	0	N	SC	10.34	2.4	2.4	12.22	13.16	6	12.02	6.7	2	0.42	-0.52	4.5	0.0	0.0	45			Y
PRD	6402	17.894	CP	48	48	48	PRO	0	0	5	3	6	MM_MM	5.30	8.6	4	0	N	CG	10.9	4.0	4.6	15.4	15.6	3.6	14.9	8.2	2	0.70	0.50	4.8	0.0	0.0	80			Y
PRD	6405	0.408	CP	48	48	40	PRO	0	0	2.50	3	3	MM_MM	5.55	8.16	4	0	N	CG	8.76	4.0	5.3	14.24	15.1	6.5	13.6	9.3	2	2.34	1.48	1.5	0.0	0.0	160			Y
PRD	6407	3.432	CP	48	48	34	PRO	0	N	9	4	5	MM_MM	5.30	5.8	4	0	N	SC	5.8	4.0	8.1	12.1	12.6	3.8	11.2	12	2	2.80	2.30	0.0	0.0	0.0	44			Y
PRD	6410	2.415	CP	48	48	40	PRO	0	0	3.5	3	3	MM_MM	5.30	9.16	4.45	0	N	LG_SC	10.16	4.0	6.2	15.12	15.9	4.3	14.78	6.1	2	1.74	0.96	2.5	-0.5	-11.3	114			Y
PRD	6415	2.339	CP2	48	48	46	PRO	0	0	5.90	3	8	MM_MM	5.55	8.4	4.3	0	N	SC	9.7	4.0	5.4	14.2	15.25	7.5	13.4	10	2	1.55	0.50	2.8	-0.3	-7.5	68			Y
PRD	6415	2.341	CP2	48	48	46	PRO	0	0	5.90	3	8	MM_MM	5.55	9.15	3	0	N	SC	10.25	4.0	5	14.95	15	4.2	14.05	9.6	2	0.75	0.70	2.4	1.0	25.0	68			Y
PRD	6415	3.366	CP	24	24	32	PRO	0	0	3.50	2	2	MM_MM	5.55	6.8	2	0	N	O_FG	8	2.0	2.9	11.7	11.9	3.4	11.3	6.2	2	1.90	1.70	3.8	0.0	0.0	57			Y
PRD	6416	2.349	CP2	48	48	60	PRO	0	0	5	4	4	MM_MM	5.3	13.94	4	0	N	LG_SC	15.78	4.0	5.7	20.44	21.02	4.9	19.54	9.2	2	1.24	0.66	3.1	0.0	0.0	80			Y
PRD	6438	0.074	CP	36	36	36	PRO	0	0	3.3	3	6	MM_MM	5.30	7.3	3	0.0	N	CG	8.6	3.0	4.2	12.1	12.3	2.3	11.6	3.7	2	0.70	0.50	3.6	0.0	0.0	91			Y
PRD	6235	19.289	AR3	40	60	44	PRO	0	0	18.3	2	2	MM1_MM1	5.55	8.55	3.9	0	N	CG_SC	9.30	3.6	4.0	13.10	14.00	7.1	8.30	24.2	2	1.10	0.20	1.7	-0.6	-17.0	27			Y
PRD	6415	5.669	PA	240	115	56	MIT	0	0	8.20	3	3	MM2_MM2	5.55	9.4	7.5	0	N	LC	11	7.6	8	19.15	20.05	6.9	18.4	13.9	2	1.45	0.55	2.9	12.5	62.5	117			Y
PRD	6350	4.612	CP	18	18	30	PRO	0	25	4.6	3	3	N	5.37	7.82	1.5	0.0	N	FS	7.88	1.3	3.2	10.18	10.46	6.3	9.34	8.1	2	1.28	1.00	0.2	0.0	0.0	33			Y
PRD	6212	0.182	CP	36	36	41	PRO	0	0	2.7	6	12	N_HC	5.37	6.55	3.0	0	0	FG	9.15	3.0	4.7	18.30	18.60	2.3	7.00	7.0	2	6.45	6.15	6.3	0.0	0.0	111			Y
PRD	6402	23.039	CP	18	18	32	PRO	0	0	2	4	16	N_N	5.30	9.3	1.5	0	N	CG	9.9	1.5	2.4	13.5	14	1	12.8	1.4	2	2.60	2.10	1.9	0.0	0.0	75			Y
PRD	6350	7.368	CP	60	60	36	PRO	0	5	5.1	5	5	NT_MM	4.95	7.24	4.9	0	N	SC_CG	9.28	5.0	6.7	15.46	16.06	4.3	14.64	26.2	2	1.78	1.18	5.7	0.1	2.0	98			Y
PRD	6350	7.372	CP	48	48	34	PRO	0	15	5.1	5	5	NT_MM	4.95	6.12	3.8	0	N	SC_CG	7.46	4.0	7.5	14.24	14.36	3.4	14.64	26.2	2	2.90	2.78	3.9	0.2	5.0	78			Y
PRD	6235	12.361	CP	36	36	46	PRO	0	0	4.9	6	8	NT_NT	5.55	9.10	3.1	0	N	LC/S	11.65	3.2	5.2	15.86	17.44	4.9	14.90	15.3	2	2.59	1.01	5.5	-0.1	-3.3	61			Y
PRD	6350	4.408	CP	24	24	28	PRO	0	0	1.4	3	5	NT_NT	4.95	6.92	2.0	0	N	CG	7.40	2.0	3.4	10.46	10.52	3.4	9.78	8.6	2	1.12	1.06	1.7	0.0	0.0	143			Y
PRD	6350	8.157	CP	24	24	40	PRO	0	0	2.3	9	5	NT_NT	4.95	7.16	2.0	0	N	CG	9.60	2.0	3.3	12.24	12.54	3.9	11.92	6.5	2	0.94	0.64	6.1	0.0	0.0	87			Y
PRD	6350	8.567	CP	36	36	32	PRO	0	20	2.3	6	0	NT_NT	4.95	6.54	2.6	0	N	FG	7.44	2.8	3.8	10.75	11.00	2.7	10.64	3.6	2	0.76	0.51	2.8	0.4	13.3	130			Y
PRD	6358	1.731	CP	36	36	40	PRO	0	0	4.3	24	15	NY_NT	4.95	9.14	3.0	0	N	LC_CG	11.32	3.0	4.8	15.88	16.24	2.8	15.04	5.3	2	1.92	1.56	5.5	0.0	0.0	70			Y
PRD	6323	0.162	CP	18	18	52	PRO	0	25	30	0	9	PA_MM	5.37	11.2	1.5	0	N	0	11.6	1.5	3	14.2	14.5	2.2	14	6.7	2	1.40	1.10	0.9	0.0	0.0	5			Y
PRD	6245	4.962	CP	36	36	40	PRO	0	0	3.5	5	5		5.55	6.52	3.0	0	N	SC	8.03	3.0	5.5	13.20	13.95	16.2	12.90	18.8	2	2.92	2.17	3.8	0.0	0.0	86			Y
PRD	6245	8.562	CP	48	48	40	PRO	0	0	4.1	7	11		5.55	6.70	4.2	0	N	CG_LC	9.37	4.0	4.9	13.80	16.20	10.6	13.10	16.6	2	2.83	0.43	6.7	-0.2	-5.0	98			Y
PRD	6407	4.526	CP	18	18	34	PRO	0	0	1.60	2	4		5.55	7.96	1.6	0	N	O	9.24	1.6	3.9	12.74	12.5	3.1	12.16	3.84	2	1.66	1.90	3.8	-0.1	-6.7	94			Y
SRD	7500	13.522	CP	18	18	24	PRO	0	0	4	2	2	MC	5	6.84	1.59	0		SC	6.9	1.59	3.25	10.2	11.1	9.2	10.3	13.1	2	2.61	1.71	0.3	-0.1	-6.0	38			Y
TRDN	2000000	86.388	CP	48	48	40		0	0	1.5	5	18	HC	5.8	10.90	3.0	0	N	0	12.60	3	7.7	22.4	22.4	3.0	22.4	5.0	2	6.80	6.80	4.3	1.0	25.0	267			Y
TRDN	2080000	0.753	CP	36	36	30		0	0	2.5	10	8	HC	5.0	6.20	3.0	0		B	7.50	3.0	4.1	10.9	11.2	2.9	10.5	3.5	2	0.70	0.40	4.3	0.0	0.0	120			Y
TRDN	2500000	0.832	CP	36	36	34		0	0	3.6	30	20	HC	5.6	4.50	3.0	0		SC_B	7.10	3.0	4.9	13.1	13.6	4.9	12.4	7.6	2	3.50	3.00	7.6	0.0	0.0	83			Y
TRDN	2700000	4.320	CP	48	48	70		0	0	5.0	12	6	HC	6.0	13.10	4.0	0		CG	14.90	4.0	7.7	26.9	27.2	11.0	26.1	18.0	2	8.30	8.00	2.6	0.0	0.0	80			Y
TRDN	2700000	1.747	CP	18	18	31		0	0	3.0	6	12	HC	6.0	7.40	1.5	0		O	8.45	1.5	2.2	12.0	12.1	4.8	11.2	5.0	2	2.15	2.05	3.4	0.0	0.0	50			Y
TRDN	2700000	1.668	CP	36	36	38		0	0	6.0	6	5	HC	5.0	8.00	3.0	0		CG	9.25	3.0	6.2	14.1	14.6	10.0	13.2	10.5	2	2.35	1.85	3.3	0.0	0.0	50			Y
TRDN	2000000	103.703	CP	36	36	62		0	0	1.5	6	5	HC1	5.6	9.40	3.0	0	NA	O_BO	10.90	3.0	3.6	15.0	15.3	3.9	14.7	4.5	2	1.40	1.10	2.4	0.0	0.0	200			Y
TRDN	1430310	0.121	CP	18	18	28		0	0	1.7	5	6	HC1	5.40	6.90	1.5	0		O	7.70	1.5	2.4	9.8	9.9	1.9	9.5	2.1	2	0.70	0.60	2.9	0.0	0.0	88			Y
TRDN	1530000	0.520	CP	72	72	48		0	0	4.5	12	5	HC2	0.0	3.30	6.0	0		LG_BO	6.10	6.0	7.8	12.6	12.9	7.5	11.6	20.0	2	0.80	0.50	5.8	0.0	0.0	133			Y
TRDN	3000578	0.141	CP	24	24	40		0	0	2.6	12	16	HC2	5.6	9.70	2.6	0		S_FG	10.90	2.0		15.4	15.4	1.2	14.8	2.0	2	2.50	2.50	3.0	-0.6	-30.0	77			Y
TRDN	2000000	103.769	CP	48	48	40		0	0	5.2	5	15	HC2	5.6	12.60	4.0	0	NA	LC_CG	13.60	4.0	5.6	19.0	19.3	1.0	18.6	5.1	2	1.70	1.40	2.5	0.0	0.0	77			Y
TRDN	2085000	0.830	CP	36	36	32		0	0	4.1	14	4	HC2	5.7	7.80	3.0	0		SC_CG	8.70	3.0	3.8	12.2	12.3	4.3	11.8	7.0	2	0.60	0.50	2.8	0.0	0.0	73			Y
TRDN	2084016	0.058	CP	24	24	40		0	0	3.2	13	8	HC2	5.7	11.30	2.0	0		BO_SC	12.80	2.0	4.6	19.5	19.6	4.1	19.0	5.0	2	4.80	4.70	3.8	0.0	0.0	63			Y
TRDN	2000000	120.309	CP	60	60	50		0	0	9.5	12	28	HC2	5.6	9.50	5.0	0	NA	CG	12.20	5.0	8.6	18.3	19.1	6.3	17.3	9.3	2	1.90	1.10	5.4	0.0	0.0	53			Y
TRDN	2000780	0.303	CP	60	60	40		0	0	11.4	9	10	HC2	5.8	8.80	5	0	NA	SC_BO	8.90	4.9	6.5	14.7	14.9	4.3	13.8	16.2	2	1.10	0.90	0.2	0.0	0.0	44			Y
TRDN	2000000	111.885	CP	48	48	43		0	0	2.9	24	10	HC5	5.6	9.35	4.2	0	NA	SC_CG	11.65	3.7	5.5	18.2	18.3	5.9	18.1	6.9	2	2.95	2.85	5.3	-0.2	-5.0	138			Y
TRDN	2000000	110.740	CP	60	60	94		0	0	8.1	31	14	HC5	5.6	24.50	5.0	0		BO_LC	32.70	5.0	8.8	44.8	45.4	8.5	45.0	13.0	2	7.70	7.10	8.7	0.0	0.0	62			Y
TRDN	2000000	128.878	CP	48	48	40		0	0	6.3	21	13	HC6	5.80	6.25	4.0	0		B_SC	8.75	4.0	5.1	14.3	14.9	6.0	14.5	6.7	2	2.10	1.50	6.3	0.0	0.0	63			Y
TRDN	3000000B	87.077	CP	24	24	40		0	0	2.8	6	6	MC	5.8	7.70	2.0	0		CG_SC	9.20	2.0	6.1	14.0	14.2	3.2	13.0	8.7	2	3.00	2.80	3.8	0.0	0.0	71			Y
TRDN	1445600	0.225	PA	67	83	64	MIT	0	0	4.9	6	4	MC1	5.40	12.80	5.6	0		SC_BO	15.30	5.7	5.8	21.7	21.9	8.5	20.7	15.4	2	0.90	0.70	3.9	0.0	-0.3	141			Y
TRDN	2900000	16.050	CP	24	24	30		0	0	1.9	4	12	MM1	5.80	6.80	2.1	0		FG_S	7.60	2.0	3.1	10.4	10.8	4.0	9.8	5.1	2	1.20	0.80	2.7	-0.1	-5.0	105			Y
TRDN	2000900	0.107	CP	24	24	40		0	0	3.2	2	2	MM1	5.7	7.80	2.8	0		O	9.50	1.8	4.2	15.0	15.6	7.2	14.0	8.9	2	4.30	3.70	4.3	-0.8	-40.0	63			Y
TRDN	1525200	1.275	CP	24	24	34		0	0	3.6	3	2	MM1	5.7	8.60	1.9	0		O_S	9.70	2.0	3.8	13.0	13.3	4.4	12.3	8.0	2	1.60	1.30	3.2	0.1	5.0	56			Y
TRDN	3000000B	86.868	CP	24	24	40		0	100		1	3	PA	5.8	9.10	2	0		O	12.90	2	3.7	17.7	19.3	4.8	18.3	8.8	2	4.40	2.80	9.5	0.0	0.0	####			Y
TRDN	2085000	3.069	CP	24	24	32		0	0	2.0	4	1	PA5	5.7	7.40	2.0	0		O	8.20	2.0	3.1	10.7	11.3	1.6	10.3	4.4	2	1.10	0.50	2.5	0.0	0.0	100			Y
TRDN	2085000	2.248	CP	24	24	40		0	0	2.0	4	2	PA5	5.7	6.30	2.0	0		S_O	7.20	2.0	3.9	10.4	10.7	4.3	9.9	8.3	2	1.50	1.20	2.3	0.0	0.0	100			Y
TRDS	3030000	16.800	CP	24	24	70	PRO	0		3.7	9	30	HC	54.0	17.10	2.0	0		O	28.60	2.0	3.5	32.3	32.50	2.9	31.7	7.2	2	1.90	1.65	16.4	0.0	0.0	54			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
TRDS	3030000	19.070	CP	36	36	36	PRO	0		4.5	8	7	HC2	5.7	8.45	3.0	0	CG	SC	9.90	3.0	4.3	14.6	14.00	7.4	13.3	8.1	2	1.10	1.70	4.0	0.0	0.0	67			Y
TRDS	2054200	0.730	CP	36	36	32	PRO	0		3.2	6	17	HC2	5.0	7.30	3.1	0		S	8.30	3.0	5.2	13.0	13.20	3.2	12.6	5.3	2	1.90	1.70	3.1	-0.1	-3.3	94			Y
TRDS	3017300	0.990	CP	48	48	40	PRO	0	0	5.3	24	22	HC6	5.6	9.30	4.1	0		LC_BO	10.10	4.0	9.6	18.5	18.70	11.2	17.6	12.1	2	4.60	4.40	2.0	-0.1	-2.5	75			Y
TRDS	2054000	2.220	pp	36	36	36		0	0	3.2	2	11	mc	5.0	6.30	3.4	0		cg	7.30	3.0	4.4	11.1	11.40	4.8	10.7	7.4	2	1.10	0.80	2.8	-0.4	-13.3	94			Y
TRDS	2000000	76.267	CP	48	48	50		0	0	3.0	1	3	MM	5.8	9.50	5.0	0		O	12.50	5.0	6.5	19.8	20.30	2.4	19.4	4.9	2	2.80	2.30	6.0	-1.0	-25.0	133			Y
TRDS	2000000	80.713	CP	60	60	72		0	0	3.9	4	6	MM	5.8	16.00	4.8	0		SG	17.80	4.7	6.0	23.5	23.90	1.9	22.6	6.8	2	1.40	1.00	2.5	0.2	4.0	128			Y
TRDS	2050000	5.780	CP	36	36	38	PRO	0		3.4	4	4	MM	5.0	6.40	2.9	0		CG	7.35	2.6	2.8	10.5	10.90	5.8	9.7	9.9	2	0.95	0.55	2.5	0.1	3.3	88			Y
TRDS	3000000	49.760	CP	18	18	40	PRO	0		1.6	1	3	MM1	5.4	8.23	1.4	0		O	8.95	1.4	2.2	11.3	11.45	26.2	11.0	3.9	2	1.08	0.98	1.8	0.1	8.2	91			Y
TRDS	2058000	1.390	CP	48	48	48	PRO	0		4.0	5	8	MM1	5.5	6.50	4.0	0		LC	7.25	4.1	5.0	12.1	12.30	3.0	11.9	6.7	2	0.95	0.75	1.6	0.0	0.0	100			Y
TRDS	2059300	0.190	PP	18	18	31	PRO	0			1	1	PA3	5.6	7.58	1.5	0	O	O	8.15	1.5	1.7	10.1	10.20	2.4	10.8	5.0	2	0.55	0.45	1.8	0.0	0.0	####			Y
TRDS	3030000	13.610	CP	36	36	40	PRO	0		9.8	3	3		4.9	8.20	3.0	0			9.18	3.0	3.4	12.1	12.56	3.8	12.2	5.6	2	0.43	0.00	2.5	0.0	-0.6	30			Y
WRD	6590	28.661	CP	72	72	55.5		0	0	5	13	12		4.75	11.10	5.8	0	0	LC	16.50	6.0	7.1	24.00	24.10	4.8	23.30	5.1	2	1.60	1.50	9.7	0.2	3.3	120			Y
WRD	6590	28.051	CP	48	48	34		0	999	5.1	23	10	HC	4.75	5.55	4.1	0	0	SC_LC	8.75	4.0	5.8	15.80	16.20	7.0	15.30	10.8	2	3.45	3.05	9.4	-0.1	-2.5	78			Y
WRD	6265	6.988	cp	36	36	41		0	0	5.5	21	14	hc	5	9.45	2.5	0	0	lc_sc	16.7	3	4.2	21.4	21.6	9.3	21.1	9.5	2	1.90	1.70	17.7	0.5	16.7	55			Y
WRD	6590	28.528	CP	36	36	30		0	0	4	9	15	HC	4.75	6.55	3.1	0	0	O	9.20	3.0	3.8	13.00	13.20	7.2	12.60	15.4	2	1.00	0.80	8.8	-0.1	-3.3	75			Y
WRD	6265	8.089	cp	72	72	52		0	0	7.5	26	24	hc	5	8	6.4	0	0	b_sc	11.7	5.3	5.3	17.9	17.9	7.4	17.4	8.7	2	0.90	0.90	7.1	-0.4	-6.7	80			Y
WRD	6265	6.287	cp	36	36	35		0	0	2.5	18	22	hc	4.75	7.4	2.8	0	0	lc_s	12.7	3	3.6	16.2	16.3	3.3	15.9	4.4	2	0.60	0.50	15.1	0.2	6.7	120			Y
WRD	6265	7.602	cp	36	36	40		0	0	4.7	16	20	hc	5	7.95	3	0	0	sc_lc	15	3	3.9	18.4	18.5	4	18.1	5.2	2	0.50	0.40	17.6	0.0	0.0	64			Y
WRD	6265	9.365	cp	54	54	46.2		0	0	6.5	13	20	hc	5	9.4	4.6	0	0	sc	11.55	4.5	4.9	16.4	16.5	5.5	15.9	6.2	2	0.45	0.35	4.7	-0.1	-2.2	69			Y
WRD	6265	0.313	cp	48	48	40.4		0	35	12	4		mc	4.75	13.2	3.9	0	0	lc	16.7	4	4.7	20.2	22	13	19.6	16.2	2	1.30	-0.50	8.8	0.1	2.5	33			Y
WRD	6265	0.767	cp	18	18	33		0	0	2	5	32	mm	4.75	7.95	1.9	0	0	fg	9.15	1.5	3	11.9	12.4	2.4	11.2	4.3	2	1.75	1.25	3.6	-0.4	-26.7	75			Y
WRD	52031	0.169	CP	18	18	26		0	0	2.2		9	MM	5.00	6.05	1.8	0		CG	6.60	1.5	3.2	9.30	9.50	3.1	9.10	5.0	2	1.40	1.20	2.1	-0.3	-20.0	68			Y
TRDN	2700000	0.276	CP	18	18	25		0	0	5.5	4	2	MC	5.0	6.80	1.7	40	SC	S	7.10	1.5	2.7	9.7	10.0	4.2	9.3	5.0	2	1.40	1.10	1.2	-0.2	-13.3	27			Y
TRDS	2000640	2.400	CP	24	24	46	PRO	0		4.7	13	17	HC2	5.0	9.00	1.9	0		LG	10.60	2.0	3.6	16.1	16.30	6.0	14.6	6.5	2	3.70	3.50	3.5	0.1	5.0	43			Y
PRD	40000	3.552	CP	24	24	40	PRO	0	0	5.3	9	10	AF_AF	5.55	12.70	2.1	0	N	S	14.83	2.0	3.7	18.56	19.45	3.7	17.30	6.6	2	2.62	1.73	5.3	-0.1	-5.0	38			Y
PRD	40000	3.739	CP	36	36	36	PRO	0	0	7.4	8	8	AF_AF	5.55	9.20	2.9	0	N	LC	11.65	3.0	3.1	15.00	15.23	3.9	14.00	5.9	2	0.58	0.35	6.8	0.1	3.3	41			Y
PRD	6235	2.182	CP	24	24	50	PRO	0	15	4.4	20	24	HC_HC	5.55	11.40	2.5	0	N	SC	15.16	2.0	2.6	17.58	18.56	3.4	17.00	6.1	2	1.40	0.42	7.5	-0.5	-25.0	45			Y
PRD	6326	3.782	CP	36	36	30	PRO	0	20	6.7	13	10	HC_HC	5.37	8.30	3.0	0	N	SC	11.25	3.0	4.8	15.3	15.7	7.0	15.1	8.0	2	1.45	1.05	9.8	0.0	0.0	45			Y
PRD	6333	1.316	CP	24	24	32	PRO	0	0	4.6	14	16	HC_HC	5.37	9.65	2.0	0	N	LC	12.80	2.0	3.0	16	16.4	7.3	15.5	9.2	2	1.60	1.20	9.8	0.0	0.0	43			Y
PRD	6350	14.308	PA	60	72	46	MIT	0	0	18.7	27	20	HC_HC	5.37	7.02	5	0.0	N	LC_BO	13.16	5	6.5	20.16	20.92	11.7	19.1	20	2	2.76	2.00	13.3	0.0	0.0	32			Y
PRD	6353	0.289	CP	60	60	60	58	0	0	10.3	14	26	HC_HC	5.37	11.3	5	0.0	N	LC	18.4	5	7	25.2	25.9	10.5	25.2	11	2	2.50	1.80	11.8	0.0	0.0	49			Y
PRD	6407	1.200	CP	48	48	100	PRO	0	0	11	8	6	HC_HC	5.30	21.8	4	0	0	LC	31.7	3.4	4.6	36.7	37.3	5	35.7	12.5	2	2.20	1.60	9.9	0.0	0.0	36			Y
PRD	6416	1.513	CP	48	48	62	PRO	0	5	8.4	7	5	HC_HC	5.3	17.06	3.94	0	N	B	19.82	4.0	6.6	24.92	25.1	2.9	24.08	9.3	2	1.28	1.10	4.5	0.1	1.5	48			Y
PRD	6436	0.491	CP	48	48	40	PRO	0	0	10.70	5	7	HC_HC	4.95	8.66	4	0	N	SC_CG	9.78	4.0	5.3	15.14	15.56	11.3	13.98	14.9	2	1.78	1.36	2.8	0.0	0.0	37			Y
PRD	6461	2.614	PA	48	46	46	PRO	0	10	9.2	5	5	HC_HC	4.75	15.8	3.9	0	N	CG	17.85	3.9	4.4	22.50	22.90	8.20	20.7	10.0	2	1.15	0.75	4.4	0.1	2.5	42			Y
PRD	40000	3.706	CP	48	48	48	PRO	0	0	11.7	7	9	HC_HC	5.55	13.40	3.7	0	N	LG_SC	17.26	4.0	4.6	21.95	23.00	4.2	20.90	4.7	2	1.74	0.69	8.0	0.3	7.5	34			Y
PRD	6402	30.066	CP	36	36	47	PRO	0	0	6	24	20	HC_-HC	5.30	6.7	3	0	N	BO	12.5	3.0	4.4	17.9	18.3	6.8	17.6	7.3	2	2.80	2.40	12.3	0.0	0.0	50			Y
PRD	40000	3.292	CP	24	24	37	PRO	0	0	4.8	9	2	HC1_NT	5.55	11.66	1.9	0	N	CG	12.10	2.0	2.9	14.85	15.80	3.9	14.30	5.8	2	1.70	0.75	1.2	0.1	5.0	42			Y
PRD	6328	4.580	CP	24	24	28	PRO	0	0	6.0	5	15	MM_HC	5.37	7.25	2.0	0	N	CG_S	7.90	2.0	2.8	12.3	12.8	3.6	12.3	7.4	2	2.90	2.40	2.3	0.0	0.0	33			Y
PRD	6405	1.184	CP	18	18	24	PRO	0	0	3.90	1	2	PA_PA	4.95	6.02	1.4	0	N	O	6.9	1.5	2.6	8.9	9.16	10.4	9	14.7	2	0.76	0.50	3.7	0.1	6.7	38			Y
TRDN	1525200	1.086	CP	18	18	34		0	0	3.5	6	14	MM1	5.7	10.10	1.4	0		FG_CG	11.10	1.5	1.8	14.6	14.8	3.6	14.3	4.9	2	2.20	2.00	2.9	0.1	6.7	43			Y
TRDN	1500000	2.699	CP	18	18	30		0	0	9.4	2	2	MM1	5.6	9.25	1.5	0		S_O	9.90	1.5	1.7	11.9	12.6	5.1	11.2	7.2	2	1.20	0.50	2.2	0.0	0.0	16			Y
TRDS	3000000	54.300	CP	24	24	41	PRO	0		4.9	3	7	HC2	5.4	9.09	2.5	0		CG	11.41	2.6	3.4	14.6	14.66	4.6	14.5	6.2	2	0.66	0.59	5.7	-0.5	-24.6	41			Y
TRDS	2050300	4.670	CP	48	48	40	PRO	0		9.7	15	10	HC2	5.6	9.30	4.0	0		B	12.00	4.0	6.5	19.2	19.50	11.8	18.3	15.3	2	3.50	3.20	6.8	0.0	0.0	41			Y
WRD	6590	26.172	CP	36	36	30		0	0	6.2	11	13	HC	5.00	8.75	2.8	0		SC	11.20	3.0	4.3	15.50	15.80	6.0	16.30	8.0	2	1.60	1.30	8.2	0.2	6.7	48			Y
WRD	52031	0.648	CP	18	18	24		0	10	3.6	5	9	HC	5.00	5.20	1.3	0		S	6.00	1.5	1.8	8.50	8.80	3.0	8.00	5.0	2	1.30	1.00	3.3	0.2	13.3	42			Y
WRD	6265	1.677	cp	24	24	32		0	10	4	21	24	hc	4.75	8.05	2	0		lc	12	2	2.9	14.5	15	6.6	14	7.9	2	1.00	0.50	12.3	0.0	0.0	50			Y
WRD	6265	7.64	cp	48	48	40.5		0	0	17.5	20	24	hc	5	4.15	2.7	0	0	b_sc	10.75	4	4.7	15.2	15.4	11	15.1	12.2	2	0.65	0.45	16.3	1.3	32.5	23			Y
WRD	6265	0.711	cp	18	18	30		0	0	5.6	3	13	mm	4.75	7.85	1.7	0	0	s	8.75	1.5	4.8	13.2	14.1	6.5	12.9	5.5	2	3.85	2.95	3.0	-0.2	-13.3	27			Y
WRD	6265	0.718	cp	18	18	30		0	0	5.6	3	17	mm	4.75	8.3	2	0	0	s	9.55	1.5	1.7	12.5	12.6	2.8	12	4.3	2	1.55	1.45	4.2	-0.5	-33.3	27			Y
WRD	6590	14.046	CP	18	18	31		0	0	3.4	6	10	MM	5.00	9.65	1.6	0		S_FG	11.20	1.5	1.8	13.70	14.00	3.7	14.20	5.2	2	1.30	1.00	5.0	-0.1	-6.7	44			Y
TRDS	3000000	53.850	CP	36	36	40	PRO	0		9.8	18	8	HC2	5.4	10.14	3.0			BO	12.92	3.0	3.9	18.8	19.09	6.2	18.7	8.2	2	3.15	2.85	7.0	0.0	0.0	30			Y
CRD	2100000	18.700	cp	48	48	47				3.9	7	11	hc	5	6.82	4.1	0		sc	9.97	4.1	4.6	14.1	14.2	4.0	13.94	6.7	2	0.10	0.03	6.7	-0.1	-2.5	103			Y
CRD	2100000	1.240	cp	24	24	30				3.3	7	2	mm	5	7.02	2.1	0		o_fg	7.87	1.9	1.9	9.2	9.8	5.8	8.60	13.0	2	0.04	-0.62	2.8	-0.1	-5.0	61			Y
TRDS	2050610	0.600	PP	24	24	50	PRO			1.8	4	6	MM1	5.0	13.35	2.0	0		O	13.60	2.0	2.4	15.7	16.10	2.6	15.4	7.4	2	0.50	0.10	0.5	0.0	0.0	111			Y
TRDS	2050610	0.200	PP	24	24	40	PRO			2.5	20	5	HC	5.0	10.40	1.8			CG	14.20	2.0	2.3	16.4	16.40	5.1	16.1	6.6	2	0.20	0.20	9.5	0.2	10.0	80			Y
CRD	2100000	12.530	cp	108	108	54				18.4	1	2	mc	5	9.51	9.7	0		fg_cg	9.94	9.0	10.2	18.8	19.5	26.2	17.72	27.9	2	0.51	-0.14	0.8	-0.7	-7.8	49			Y
CRD	2014000	3.010	cp		26	30				9.5	5	5	af	5	9.38	2.6	0		sc_lc	9.88	2.6	2.7	12.2	12.5	10.6	11.48	14.7	2	0.06	-0.24	1.6	-2.6	#####	23			Y
CRD	2150000	8.870	cp	48	48	40				4.4	3	4	mm	5	8.56	4.2	0		sc	9.38	4.0	4.4	13.0	14.0	9.2	12.47	11.2	2	0.63	-0.39	2.1	-0.2	-5.0	91			Y
TRDS	2050610	0.630	PP	18	18	30	PRO			2.3	2	4	MM	5.0	7.10	1.5	0		O	7.85	1.5	2.0	0.5	10.60	3.1	10.0	4.7	2	1.25	-8.85	2.5	0.0	0.0	65			Y
CRD	2100000	19.490	cp	24	24	36				3.5	5	5	hc	5	8.17	2.0	0		lc_sc	10.70	2.0	4.6	15.5	17.0	6.1	15.29	7.2	2	4.30	2.76	7.0	0.0	0.0	57			Y
CRD	2100000	2.360	cp	36	36	50				3.6	4	7		5	9.15	3.1	0		cg	10.40	3.0	6.0	16.2	16.5	10.0	15.98	12.0	2	3.07	2.81	2.5	-0.1	-3.3	83			Y

FISH PASSAGE ANALYSIS DATA
GREEN/GREY/RED

DISTRICT	RTE_NO	MP	FEAT	HGT	WID	LEN	ENT	BLK	SD	B_US	U_GD	D_GD	CHT	HI	TC_I	CO_I	BLD_C	BLD_T	U_SB	TC_O	CO_O	PD	WSE	TC	B_TC	OHW_O	OHW_W	VERIFIED	PRCH_TC	PRCH_WSE	CUL_GRD	BDLD_D_I	INV_B_%	CULW_BW	GREEN	GRAY	RED
CRD	2100000	4.420	cp	24	24	30				3.2	18	15	hc	5	7.35	2.0	0		bo	9.48	2.0	3.3	13.6	13.8	3.0	12.47	4.2	2	2.30	2.13	7.1	0.0	0.0	63			Y
CRD	2150000	5.100	cp	36	36	34				5.8	25	19	hc	5	7.05	3.2	0		sc_lc	8.73	3.0	4.3	15.3	15.7	4.8	14.63	8.2	2	3.99	3.59	4.9	-0.2	-6.7	52			Y
CRD	2150000	9.460	cp	36	36	32				4.1	12	24	hc	5	6.69	3.3	0		sc	10.01	3.0	3.9	15.5	15.7	6.2	14.86	7.4	2	2.71	2.45	10.4	-0.3	-10.0	73			Y
CRD	2100000	1.790	cp	24	24	40				3	5	1	mm	5	10.63	2.4	0		cg_s	11.65	2.0	2.6	14.1	15.7	7.2	13.42	8.3	2	2.10	0.46	2.5	-0.4	-20.0	67			Y
CRD	2100000	5.190	cp	24	24	58				3	5	10	hc	5	17.59	2.0	0		o_b	19.91	2.0	6.4	27.1	27.2	7.3	26.80	9.2	2	5.32	5.18	4.0	0.0	0.0	67			Y
CRD	2100000	6.510	cp	36	36	40				4.6	6	20	hc	5	8.33	3.0	0		lc_bo	10.53	3.0	4.2	14.1	14.2	9.0	13.62	11.7	2	0.71	0.54	5.5	0.0	0.0	65			Y
CRD	2100000	19.250	cp	36	36	30				5.6	11	13	hc	5	6.92	3.1	0		sc_lc	7.87	3.0	4.4	12.0	12.1	3.2	11.32	8.6	2	1.20	1.10	3.2	-0.1	-3.3	54			Y
CRD	2150000	0.530	cp	36	36	40				4.6	8	12	hc	5	11.75	3.0	0		lc	14.89	3.0	3.0	18.9	19.1	5.7	18.54	6.6	2	1.17	1.00	7.9	0.0	0.0	65			Y
CRD	2150000	4.000	cp	36	36	40				3.9	10	17	hc	5	6.63	3.1	0		sc_lc	6.99	3.0	3.2	15.2	15.4	5.0	14.40	8.7	2	5.43	5.20	0.9	-0.1	-3.3	77			Y
CRD	2150000	4.410	cp	60	60	50				8	21	18	hc	5	7.55	5.1	0		bo_lc	15.09	5.0	7.2	22.7	23.0	16.0	22.21	17.7	2	2.87	2.58	15.1	-0.1	-2.0	63			Y
CRD	2150000	9.550	cp	60	60	49				7.7	10	14	hc	5	10.50	5.0	0		sc_lc	16.11	5.0	5.4	22.1	22.4	6.5	21.42	9.6	2	1.33	0.97	11.4	0.0	0.0	65			Y
CRD	2014000	0.330	cp		24	30				2.8	4	11	hc_mm	5	8.01	2.0	0		sc	9.65	2.0	2.3	12.0	12.2	2.0	11.48	6.3	2	0.53	0.39	5.5	-2.0	#####	71			Y
CRD	2100000	18.390	cp	36	36	36				3.7	13	7	hc_mm	5	6.59	3.1	0		lc	10.17	3.0	4.1	14.3	14.3	4.0	13.62	7.6	2	1.10	1.13	9.9	-0.1	-3.3	81			Y
CRD	2150000	8.920	cp	36	36	36				3.3	2	7	mm	5	7.87	3.2	0		s_o	8.66	3.0	4.1	12.8	13.3	2.9	12.40	5.5	2	1.59	1.13	2.2	-0.2	-6.7	91			Y
CRD	2100000	4.530	cp	18	18	34				1.2	3	0	mm_pa	5	6.92	1.5	0		s_o	8.66	1.5	1.7	11.0	11.2	0.6	10.43	3.5	2	0.99	0.86	5.1	0.0	0.0	125			Y
WRD	6265	2.414	pa	50	76	38				7.6	8	8	mm	4.75	6.6	4.25	0	0	lc_s	7.85	4	5.7	12.7	13.3	9.6	11.6	10	2	1.45	0.85	3.3	-0.1	-2.0	83			Y
CRD	2100000	20.480	cp	24	24	30				4.4	9	7	hc	5	7.78	4.0	0		lc	8.86	4.0	5.4	14.1	14.3	3.5	13.52	6.5	2	1.48	1.22	3.6	-2.0	-100.0	45			Y
CRD	2150000	7.320	cp	24	24	44				4.5	18	4	hc	5	7.58	2.0	0		sc_lc	9.58	2.0	2.8	12.9	13.1	2.5	28.21	8.6	2	1.51	1.31	4.5	0.0	0.0	44			Y
CRD	2100000	12.740	cp	70	70	108				18.5	1	7	mc	5	10.70	9.5	0		fg_cg	12.89	9.1	9.8	22.3	23.0	15.4	21.00	19.7	2	1.04	0.35	2.0	-3.7	-62.9	32			Y
CRD	2150000	7.280	cp	24	24	34				5.8	7	4	mc	5	7.41	2.1	0		cg_sc	9.12	2.0	2.5	11.8	12.1	6.4	11.38	6.8	2	1.02	0.69	5.0	-0.1	-5.0	34			Y
TRDN	2000000	120.792	CPB	60	60	60		I	I	5.8	9	6	HC2	5.6	13.90	4.3	100	LC_BO	LC_BO	16.80	5.2	5.8	21.121.8		7.8	20.2	10.0	2	-22.00	#####	4.8	0.7	14.0	86		Y	
TRDN	2000000	106.598	CO	216	107	96		0	0	6.0	8	3	MC	5.6	16.20	9.1	100	BO	B	20.40	9.6	9.7	29.3	30.6	8.3	26.6	27.8	2	0.60	-0.70	4.4	8.9	49.4	149		Y	
SRD	7500	13.140	CP	36	36	28	PRO	0	0	4	2	2	MC	5	7.05	2.97	0		SC	7.32	3	2.98	9.96	10.3	6	9.8	8	2	-0.02	-0.36	1.0	0.0	1.0	75		Y	
TRDN	1530000	1.214	CPB	36	36	43		0	0	4.5	7	7	HC2	6.1	12.30	2.9	0	NA	CG_BO	15.80	3.0	3.3	18.7	18.9	4.4	18.5	6.5	2	0.10	-0.10	8.1	0.1	3.3	67		Y	
TRDN	2000000	115.861	CP	60	60	40		0	0	NA	1	1	PA5	5.6	9.70	5.8	100	O	O	9.80	5.8	6.1	12.6	NA	NA	12.4	NA	2	######	-3.00	0.3	-0.8	-16.0	####	Y		
TRDN	1445000	5.455	CP	72	72	62		0	0	NA	1	0	PA5	5.4	9.70	6.0	100	O	O	9.20	5.8	6.1	13.6	NA	NA	NA	NA	2	######	-1.40	-0.8	0.0	0.0	####	Y		
TRDN	2086000	0.650	CP	36	36	40		0	0	NA	1	1	PA5	5.7	7.00	3.4	0		O	7.10	3.0	3.3	7.3	NA	NA	NA	NA	2	######	-2.80	0.2	-0.4	-13.3	####	Y		

FAILURE MECHANISM FOR ROAD SURFACE EROSION

	FAILURE MECHANISM	FREQUENCY
BD	BLOCKED DITCH(obsolete code)	29
BV	BEAVER ACTIVITY	9
CS	CULVERT IS TOO SHORT	28
CSC	CUT-SLOPE SLUMPING OR SLIDING INTO CULVERT	40
CSD	CUT-SLOPE SLUMPING OR SLIDING INTO DITCH	328
DF	DEBRIS FLOW	3
EC	HYDRAULIC FLOW EXCEEDED CAPACITY	44
FS	FILL SLUMP OR SLIDE	108
IB	IMPROPER INSTALLATION	3
MDB	MISSING OR INADEQUATE DITCH(blasting required)	16
MDD	MISSING OR INADEQUATE DITCH(diggable material)	288
MI	MISSING STRUCTURE	4
MP	MECHANICAL DAMAGE OR JOINTS PARTING	2
MT	MATERIAL INADEQUATE FOR DESIGNED USE	5
OS	OVERSTEEPENED SLOPES	366
OT	OTHER(specify in notes)	66
RF	ROAD FILL(pushed off road by grader)	3
RG	ROAD GRADE NEEDS CROWNING/SHAPING	94
SC	SIDECAST MATERIAL CRACKING OFF ROADWAY	4
SD	STREAM IN DITCH	5
SDC	SEDIMENT ACCUMULATION IN CULVERT	13
SDD	SEDIMENT ACCUMULATION IN DITCH	88
SS	SUBSIDENCE	29
WDC	WOODY DEBRIS IN CULVERT	7
WDD	WOODY DEBRIS IN DITCH	10
WX	WEATHERING	4

VERIFIED FISH CULVERTS WITH OUTLET EROSION REQUIRING CORRECTIVE ACTION

District	RTE_NO	MP	SYS	FEAT	HGT	WID	LEN	IE	OE	BLK	AHMU	HAB
CRD	2000210	0.690	TR	CP	48			N	D	20	2	D
CRD	2000210	0.900	TR	CP	48			N	D	0	2	D
CRD	2000210	0.970	TR	CP	36			N	D	0	2	D
CRD	2000210	1.390	TR	CP	18			N	F	15	2	B
CRD	2013000	0.081		cp		60	40	I	f		1	b
CRD	2013000	0.100		cp		48	33	f	f		3_1	d
CRD	2013100	0.010		cp		18 -24?		I	f_o	50	1	b
CRD	2014000	0.330	TR	CP	24		30	N	B	0	2	B
CRD	2014000	3.010		cp		26	30	n	f		2	b
CRD	2025000	0.500	20MI	CP	18			N	F	0	2	B
CRD	2026000	1.990	20MI	CP	36		30	N	F	0	2	D
CRD	2100000	2.070	TR	CP	72		52	N	B	0	1	D
CRD	2100000	2.360		cp	36		50	n	f		2	b
CRD	2100000	5.190		cp	24		58	f	f		2	b
CRD	2100000	5.190	TR	CP	24			N	F	0	2	B
CRD	2100000	5.710		cp	36		36	n	f	0	1	b
CRD	2100000	5.710	TR	CP	36			N	F	15	1	B
CRD	2100000	6.510		cp	36		40	n	o		3_2	d
CRD	2100000	12.530		cp	108		54	n	b		2	b
CRD	2100000	12.530	PK	CP	108		54	N	B	0	2	B
CRD	2100000	12.740	PK	CP	108		70	N	F	0	2	B
CRD	2100000	14.380	PK	CP	108		54	I	D	0	1	B
CRD	2100000	15.270	PK	CP	36			N	F	0	1	D
CRD	2100000	19.490		cp	24		36	n	b_o		2	b
CRD	2100000	19.490	PK	CP	24			I	B	0	2	B
CRD	2100000	20.480		cp	24		30	n	o		2	b
CRD	2100000	20.480	PK	CP	48			N	O	0	2	B
CRD	2100000	20.570	PK	CP	72			I	F	0	2	B
CRD	2120000	0.210	12MI	CP	48		30	N	O	0	2	B
CRD	2135000	0.210	PK	CP	36			N	D	10	2	B
CRD	2135000	0.430	PK	CP	108		86	I	F	15	1	D
CRD	2150000	0.530		cp	36		40	f	f		2	b
CRD	2150000	2.940		pa_ar	122	163	81	n	b		1	b
HRD	8508	4.306	HH	CP	48		36.2	N	Y	0	2	B
HRD	8508	4.540	HH	CMP	48	62		N	Y	0	2	B
HRD	8530	4.130	HH	CP	24		48	N	D	10	1_1	B
HRD	8578	0.129	HH	CP	24	24	30	N	O	100	2	D
HRD	8578	0.608	HNH	CP	24	24	34	N	D	0	2	B
HRD	8578	1.020	HNH	CP	24	24	37	N	F	20	2	B
HRD	8580	2.019	EF	CP	24			N	D	0	4_2	D
HRD	8580	2.035	EF	CP	24		44	N	D	0	2_2	B
HRD	8580	2.089	EF	PA	42	54		N	D	0	2_2	B
HRD	8580	2.112	EF	CP	36			N	D	0	2_2	B
HRD	8580	2.166	EF	CP	36		48	N	D	0	2_2	B
HRD	8580	2.657	EF	CP	36		51	N	D	0	2_2	B
HRD	8580	3.251	EF	CP	48		38	F	F	0	2_2	B
HRD	85811	3.909	EF	CP	18.0			N	D	0	2_2	B

VERIFIED FISH CULVERTS WITH OUTLET EROSION REQUIRING CORRECTIVE ACTION

District	RTE_NO	MP	SYS	FEAT	HGT	WID	LEN	IE	OE	BLK	AHMU	HAB
JRD	8553	0.406	CV	CP	54	54	40	N	D	0	1_1	B
JRD	8553	11.695	CV	CP	24		37	N	F	0	1_1	B
PRD	6030	8.947	KK	CP	36	36	38	N	B	0	2_2	B
PRD	6030	11.712	KK	CP	48	72	57	I	O	75	2_2	B
PRD	6040	8.525	KK	CP	36	36	44	N	F	25	2_2	B
PRD	6040	15.221	KK	CP	36	36	39	I	D	0	2_2	B
PRD	6212	0.106	MT	CP	72	72	30	N	F	0	2_2	B
PRD	6317	2.112	PB	CP	72	72	44	N	F	15	2_2	B
PRD	6319	7.778	PB	CP	36	36	34	M	M	0	2_2	B
PRD	6326	1.191	KK	CP	48	48	40	N	F	0	2	B
PRD	6350	15.318	TK	CP	36	36	30	N	F	0	2_2	B
PRD	6366	0.105	KK	PA	48	72	38	I	F	95	2_2	B
PRD	6407	3.432	RB	CP	48	48	34	N	F	0	2_2	B
PRD	6407	3.432	RB	CP	48	48	34	N	F	0	2_2	B
PRD	6407	4.526	RB	CP	18	18	34	N	F	0	2_2	B
PRD	6415	2.339	RB	CP	48	48	45	N	F	0	2_2	B
PRD	6415	2.341	RB	CP	48	48	45	N	F	0	2_2	B
PRD	6415	7.198	RB	CP	60	60	50	F	F	0	2	B
PRD	6416	0.767	RB	CP	48	48	50	N	F_B	0	1_1	B
PRD	6416	1.841	RB	CP2	48	48	40	N	F	50	2	B
PRD	6416	1.842	RB	CP2	48	48	40	N	F	15	2	B
PRD	6420	1.886	RB	CP	48	48	40	F	F	0	3_2	B
PRD	6434	2.568	RB	CP	48	48	50	N	F	0	2_2	B
PRD	6441	1.296	RB	CP	24	24	24	N	F	0	2_2	B
PRD	45001	0.185	KK	CP	36	36	49	N	F	0	1	B
PRD	45001	0.185	KK	CP	36	36	50	N	B	0	1_1	B
SRD	7540	2.024	FI	CP	18		32	N	O	0	1_1	B
SRD	7540	3.615	FI	CP	36		41	N	F	0	2_2	U
SRD	7540	3.615	FI	CP	36		41	N	F	0	2_2	U
SRD	7540	3.955	FI	CP	36		36		F	0	1_1	B
SRD	7540	3.955	FI	CP	36		36		F	0	1_1	B
TRDN	1445630	1.527	HC	CP	24.0		27	N	OT	0	1	B
TRDN	2000000	123.830	WP	CP	36		30	N	O	0	1	B
TRDN	2000900	0.634	LB	CP	36		30	N	F	0	2	B
TRDN	3000000B	81.438	WP	CP	48		50	Y	Y	100	1	U
TRDN	3000000B	86.868	WP	CP	24		40	N	O	0	2	U
TRDS	2000530	0.260	ST	CP	48		48	N	F	80	2	B
TRDS	2050000	2.320	ST	CP	24		30	N	F	0	2	B
TRDS	2050000	3.890	ST	CP	24		26	F	F	0	2	B
TRDS	2050000	4.310	ST	CP	48		38	N	F	0	2	B
TRDS	2050000	4.640	ST	CP	36		26	N	F	0	2	B
TRDS	2050000	5.390	ST	CP	60		38	F	F	0	2	B
TRDS	2050220	0.590	ST	CP	48			I	O	100	1	D
TRDS	2050610	0.200	WH	PP	24		40	N	F		2	B
TRDS	2050610	0.370	WH	PP	36		40	I	F		2	B
TRDS	2050800	1.140	WH	CP	24		33	N	O	0	2	B
TRDS	2050800	2.690	WH	CP	48		40	B	B	0	2	B

VERIFIED FISH CULVERTS WITH OUTLET EROSION REQUIRING CORRECTIVE ACTION

District	RTE_NO	MP	SYS	FEAT	HGT	WID	LEN	IE	OE	BLK	AHMU	HAB
TRDS	2051050	1.330	WH	CP	36		34	N	O	95	1	
TRDS	2054000	0.020	st	cpb	48	48	120	n	f	0	1	b
TRDS	2054000	7.310	st	pp	24	24	40	n	ot	0	2	b
TRDS	2054200	0.730	ST	CP	36		32	N	D	0	2	B
TRDS	2054300	0.460	st	pa	67	95	40	i	f	0	1	b
TRDS	3000000	17.700	TB	CP	48			N	B	0	2	B
TRDS	3000000	19.480	TB	CP	18		40	I	O	20	2	B
TRDS	3000000	21.900	TB	CP	48			I	O	0	2	B
TRDS	3030600	0.030	CC	CP	36		35	F	F	20	2	B
WRD	6265	0.711	wg	cp	18	18	30	n	b	0	2_2	u
WRD	6265	0.767	wg	cp	18	18	33	n	b	0	2_2	b
WRD	6265	2.414	wg	pa	50	76	38	n	b		2_2	b
WRD	6585	11.447	ZA	CP	72	90	48.5	B	F	0	1	BT
WRD	6590	1.700	ZA	CP	24	24		F	F	0	1	AUS
WRD	6590	1.719	ZA	CP	36	36		N	O	33	1	AUS
WRD	6590	10.545	ZA	CO	37	72	38	N	O	45	1	AUS
WRD	6590	11.197	ZA	CP	48	48	40.2	B	B	0	1	AUS
WRD	6590	11.597	ZA	AR	108	174	58	B	B	0	1	AUS
WRD	6590	11.607	ZA	AR	108	174	48	N	B	0	1	AUS
WRD	6590	17.168	ZA	CP	36	36	30	N	O	0	1	B
WRD	6590	26.172	ZA	CP	36	36	30	F	F	0	2	B
WRD	6590	26.624	ZA	CP	18	18	28	I	O	100	2	B
WRD	6590	27.907	ZA	CO	3.2	6.33	33	N	F	15	2	B
WRD	6590	28.051	ZA	CP	48	48	34	N	F	0	2	D
WRD	6590	28.661	ZA	CP	72	72	55.5	N	B	0	2	D
WRD	6590	28.661	ZA	CP	72	72	62	F	F	0	2	RDS
WRD	6590	28.778	ZA	CP	48	48	40	N	F	0	2	D
WRD	6590	31.556	ZA	AR	7	9.7	54	N	F	0	2	RBT
WRD	6590	34.427	ZA	CP	72	72	48	N	F	0	2	RUS
WRD	6590	36.079	ZA	CP	48	48	40.5	N	B	0	2	RUS
WRD	6590	37.255	ZA	CP	36	36	57	N	B	0	2	RUS
WRD	6590	37.256	ZA	CP	36	36	57	N	B	0	2	RUS
WRD	6597	2.610	ZA	CP	36	36	25	F	F	35	2	RBS
WRD	52031	0.169	ZA	CP	18	18	26	O	F	0	2_2	B
WRD	52031	0.247	ZA	CP	48	48	30	F_B	F	0	2_2	B
WRD	52031	0.463	ZA	CP	24	24	28	O	OE	0	2_2	B
WRD	52031	0.615	ZA	CP	24	24	30	B_I	B	0	1_1	B
WRD	52031	0.648	ZA	CP	18	18	24	F_B	F_B	0	1_1	B

VERIFIED FISH CULVERTS WITH INLET EROSION REQUIRING CORRECTIVE ACTION

District	RTE_NO	MP	SYS	FEAT	PRM	HGT	WID	LEN	IE	OE	BLK	AHMU	HAB
CRD	2000210	1.370	TR	CP	SC	24			F	N	0	2	B
CRD	2013000	0.081		cp	sc		60	40	I	f		1	b
CRD	2013000	0.100		cp	sc		48	33	f	f		3_1	d
CRD	2013100	0.010		cp	sc_se		18 -24?		I	f_o	50	1	b
CRD	2100000	4.600		cp	c_se_fe_h	24		30	f_b	n		2	b
CRD	2100000	5.190		cp	sc	24		58	f	f		2	b
CRD	2100000	12.740		cp	sc	70		108	f	n		2	b
CRD	2100000	12.940	PK	CP	SC	36			B	N	0	2	B
CRD	2100000	14.380	PK	CP	SC	108		54	I	D	0	1	B
CRD	2100000	19.490	PK	CP	SC	24			I	B	0	2	B
CRD	2100000	20.570	PK	CP	SC	72			I	F	0	2	B
CRD	2120000	9.580	12MI	CP	SC	60		46	B	N	0	2	B
CRD	2135000	0.430	PK	CP	SC	108		86	I	F	15	1	D
CRD	2135500	3.680	PK	CP	SC	72			F	N	0	2	D
CRD	2150000	0.530		cp	sc	36		40	f	f		2	b
CRD	2150000	7.280		cp	sc	24		34	f	n		2	b
HRD	8530	3.077	HH	CP	SC	48		36	F	N	0	1_1	B
HRD	8530	3.090	HH	PA	SC	46	72	30	F	N	0	1_1	B
HRD	8530	3.527	HH	CP	SC	48		32	F	N	0	1_1	B
HRD	8530	4.158	HH	CP	SC	60		38	F	N	N	1_1	B
HRD	8579	1.162	SL	CP	SC	48		32.5	Y	N	0	2	B
HRD	8580	3.251	EF	CP	SC	48		38	F	F	0	2_2	B
HRD	8580	4.318	EF	CP	NS	18			F	N	0	5_1	D
JRD	8553	4.238	CV	CP	SC	36		35	F	N	20	1_1	B
JRD	8555	2.941	CV	CP	SC	18			I	N	0	1_1	B
JRD	85532	0.198	CV	PA	SC	66	76	54	F	N	0	2_2	B
PRD	6030	9.223	KK	CP	SC	48	48	40	F	N	0	2_2	B
PRD	6030	11.712	KK	CP	SC	48	72	57	I	O	75	2_2	B
PRD	6031	2.823	PB	PA	SC	66	84		F	N	0	1_1	B
PRD	6031	4.340	PB	CP	SC	48	48	38	F	N	0	1_1	B
PRD	6031	5.840	PB	CP	SC	36	36	40	F	N	0	1_1	B
PRD	6031	6.631	PB	CP	SC	24	24	40	F	N	0	1_1	B
PRD	6031	11.707	PB	CP	SC	36	36	46	F	N	0	2_2	B
PRD	6032	0.133	PB	CP	SC	36	36	34	I	N	0	1_1	B
PRD	6040	11.336	KK	PA	SC	82	126	42	I	N	40	1_1	B
PRD	6040	15.221	KK	CP	SC	36	36	39	I	D	0	2_2	B
PRD	6206	1.748	MT	CP	SC	60	60	30	F		40	2	B
PRD	6314	4.283	KK	CP	SC	36	36	48	B	N	0	1_1	B
PRD	6317	4.453	PB	CP	SC	72	72		F	N	0	2_2	B
PRD	6317	5.841	PB	CP	SC	36	36	30	F	N	0	2_2	B
PRD	6319	8.709	PB	CP	SC	36	36	30	I	N	0	2_2	B
PRD	6319	10.379	PB	CP	SC	36	36	48	F	N	0	2_2	B
PRD	6319	10.975	PB	CP	SC	36	36	34	F	N	0	2_2	B
PRD	6333	0.062	KK	CP	SC	18	18	40	I	N	0	1_1	B
PRD	6333	1.069	KK	CP	SC	36	36	36	I	N	60	2_2	B
PRD	6350	7.372	TK	CP	SC	48	48	34	F	N	0	2_2	B
PRD	6352	7.000	TK	CP	SC	36	36	50	I	N	50	2_2	B
PRD	6366	0.105	KK	PA	SC	48	72	38	I	F	95	2_2	B
PRD	6402	13.202	RB	CP	SC	36	36	32	F	N	35	1_1	B

VERIFIED FISH CULVERTS WITH INLET EROSION REQUIRING CORRECTIVE ACTION

District	RTE_NO	MP	SYS	FEAT	PRM	HGT	WID	LEN	IE	OE	BLK	AHMU	HAB
PRD	6405	1.184	RB	CP	SC	18	18	24	F	N	0	2	B
PRD	6410	0.513	RB	CP	SC	36	36	50	B	N	15	2_2	B
PRD	6415	1.008	RB	CP	SC	48	48		F	N	0	2	B
PRD	6415	2.118	RB	CP	SC	48	48	50	F	N	0	2	B
PRD	6415	7.198	RB	CP	SC	60	60	50	F	F	0	2	B
PRD	6420	1.419	RB	CP	SC	72	72		F	N	15	2_2	B
PRD	6420	1.578	RB	CP	SC	48	48	30	F	N	20	2_2	B
PRD	6420	1.886	RB	CP	SC	48	48	40	F	F	0	3_2	B
PRD	6441	0.613	RB	CP	SC	48	48	30	F	N	70	2	B
PRD	6441	0.613	RB	PA	SC	48	48	30	F	N	90	2_2	B
PRD	46095	2.409	RB	CP	SC	48	48	40	F	N	10	2	B
SRD	7500	6.859	IR	CP	SC	48	48		I	N	0	1	N
SRD	7500	7.506	IR	CP	SC	60	60	32	I_F	N	60	1	B
SRD	7502	4.345	IR	CP	SC	48	48		I	N	0	2	
SRD	7540	4.363	FI	CP	SC	48		30	F	N	0	2_I	B
SRD	7540	5.536	fi	cp	sc	72	72	53	f	n	0	1	b
TRDN	1425000	0.341	HEC	CP	SC	18		32	I	F	10	2	B
TRDN	1480000	4.090	MAR	CP	SC	36		29	I	N	30	2	B
TRDN	2085000	2.659	LB	CP	SC	48		40	F	N	5	2	B
TRDN	2500000	0.677	WP	CP	SC	48		38	I	B	0	2	B
TRDN	2700000	0.710	WP	CP	SC	48		40	F	N	0	1	B
TRDN	2700000	5.673	WP	CP	SC	36		36	F	B	0	1	B
TRDS	2030120	1.300	TB	CP		84		40	F		0	2	B
TRDS	2030120	1.680	TB	CP		84		52	F		0	2	D
TRDS	2050000	3.890	ST	CP	SC	24		26	F	F	0	2	B
TRDS	2050000	5.050	ST	CP	SC	36		30	F	N	5	2	B
TRDS	2050000	5.390	ST	CP	SC	60		38	F	F	0	2	B
TRDS	2050000	5.780	ST	CP	SC	36		38	F	N	0	2	B
TRDS	2050220	0.590	ST	CP	SC	48			I	O	100	1	D
TRDS	2050300	8.100	ST	CP	SC	60		40	O	N	100	2	B
TRDS	2050400	0.560	ST	CP	SC	48		41	I	N	0	1	B
TRDS	2050610	0.300	WH	PP	SC	36		40	F	N	5	2	B
TRDS	2050610	0.370	WH	PP	SC	36		40	I	F		2	B
TRDS	2050800	2.690	WH	CP		48		40	B	B	0	2	B
TRDS	2054000	2.030	st	cp	sc	60	60	46	f_b	n	0	1	b
TRDS	2054000	2.220	st	pp	sc	36	36	36	i	n	0	2	b
TRDS	2054000	4.600	st	cp	sc	84	84	58	f	n	0	2	b
TRDS	2054300	0.460	st	pa	sc	67	95	40	i	f	0	1	b
TRDS	3000000	19.320	TB	CP	SC	18			I	N	60	2	B
TRDS	3000000	19.480	TB	CP	SC	18		40	I	O	20	2	B
TRDS	3000000	21.900	TB	CP	SC	48			I	O	0	2	B
TRDS	3000000	37.140	RZ	CP	SC	36		30	B	N	0	1	B
TRDS	3000000	47.290	CC	CP	SC	48		40	B	N	50	2	B
TRDS	3000000	48.610	CC	CP	SC	18		25	I	N	50	1	D
TRDS	3000000	57.730	CC	CP	SC	96		60	B	N	0	1	B
TRDS	3000000	58.490	CC	CP	SC	24			I	N	100	2	B
TRDS	3000000	58.630	CC	CP	DR	18			I	N	100	2	D
TRDS	3000000	58.860	CC	CP	SC	24		32	I	N	80	1	B
TRDS	3000000	58.950	CC	CP	SC	48		40	B	N	0	2	B

VERIFIED FISH CULVERTS WITH INLET EROSION REQUIRING CORRECTIVE ACTION

District	RTE_NO	MP	SYS	FEAT	PRM	HGT	WID	LEN	IE	OE	BLK	AHMU	HAB
TRDS	3000000	62.780	CC	CP	SC	36		40	I	N	40	2	B
TRDS	3000000	62.890	CC	CP	SC	48		60	I		70	2	D
TRDS	3000200	2.120	TB	CP	SC	72		38	B	N	0	2	B
TRDS	3000272	0.130	TB	PA	SC	67	95	46	B	N	0	1	B
TRDS	3015000	11.130	TB	CP	SC	72		51	F	N	0	2	D
TRDS	3018000	0.031	TB	PA	SC	4.5	6	66	B	N	0	2	B
TRDS	3018000	0.490	TB	CP	SC	84		54	B	N	0	2	B
TRDS	3018000	0.740	TB	CP	SC	72		66	B	N	0	2	B
TRDS	3018000	4.281	TB	CP	SC	48		40	B	N	0	2	B
TRDS	3020000	0.730	TB	CP	SC	60		40	B	N	0	1	B
TRDS	3020000	0.740	TB	CP	SC	60		40	B	N	0	2	B
TRDS	3030000	0.050	CC	PA	SC	91	141	47.5	B	N	10	2	B
TRDS	3030000	18.410	CC	CP	SC	36		40	B	N	0	2	B
TRDS	3030000	19.070	CC	CP	SC	36		36	B	N	0	2	B
TRDS	3030600	0.030	CC	CP	SC	36		35	F	F	20	2	B
WRD	6265	2.524	wg	cp	sc	24	24	30.5	r	n	0	2_2	b
WRD	6265	6.988	wg	cp	sc	36	36	41	I	n	0	1_2	b
WRD	6265	7.602	wg	cp	sc	36	36	40	b	n	0	3_2	b
WRD	6265	7.64	wg	cp	sc	48	48	40.5	i_f	n	0	3_2	b
WRD	6265	7.693	wg	cp	sc	48	48	48	i	n	60	3_2	b
WRD	6265	8.089	wg	cp	sc	72	72	52	f_i	n	0	2_2	b
WRD	6585	7.968	ZA	CP	SC	90	120	52.5	F	N	0	1	BT
WRD	6585	11.447	ZA	CP	SC	72	90	48.5	B	F	0	1	BT
WRD	6590	1.700	ZA	CP	DR	24	24		F	F	0	1	AUS
WRD	6590	11.197	ZA	CP	SC	48	48	40.2	B	B	0	1	AUS
WRD	6590	11.597	ZA	AR	SC	108	174	58	B	B	0	1	AUS
WRD	6590	26.172	ZA	CP	SC	36	36	30	F	F	0	2	B
WRD	6590	26.624	ZA	CP	SC	18	18	28	I	O	100	2	B
WRD	6590	26.858	ZA	AR	SC	70	90	39	O	N	85	1	B
WRD	6590	28.661	ZA	CP	SC	72	72	62	F	F	0	2	RDS
WRD	6590	33.096	ZA	AR	SC	69	99	48	F	N	0	2	RUS
WRD	6590	34.367	ZA	CP	SC	60	60	56	R	N	0	2	RUS
WRD	6590	35.632	ZA	CP	SC	60	60	48	B	N	0	2	RUS
WRD	6597	2.610	ZA	CP	SC	36	36	25	F	F	35	2	RBS
WRD	52008	0.491	ZA	PA	SC	36	36	32	F			2	RBS
WRD	52031	0.169	ZA	CP	SC	18	18	26	O	F	0	2_2	B
WRD	52031	0.247	ZA	CP	SC	48	48	30	F_B	F	0	2_2	B
WRD	52031	0.463	ZA	CP	SC	24	24	28	O	OE	0	2_2	B
WRD	52031	0.615	ZA	CP	SC	24	24	30	B_I	B	0	1_1	B
WRD	52031	0.648	ZA	CP	SC	18	18	24	F_B	F_B	0	1_1	B

VERIFIED FISH CULVERTS WITH BLOCKAGES BY DISTRICT

AHMU	DISTRICT	RTE_NO	MP	SYS	FEAT	FAIL	HGT	WID	LEN	BLK	CHT	SSC	A_REQ	PRI
1	CRD	2013100	0.010		cp	:_ib_cs_sd_rf		18		50	hc	fh	h	c
2	HRD	8578	0.129	HH	CP	SDC	24	24	30	100	HC	DR	H	C
2	HRD	8578	3.490	HH	CP	SDC	18	18	37	50	HC	N	L	N
2	HRD	8578	0.111	HH	CP	MP	24	24	32	20	HC	FH	N	N
2	HRD	8578	1.020	HNH	CP	N	24	24	37	20	HC2	N	X	N
2	HRD	8578	3.020	HH	CP	N	24	24	36	20	HC2	N	N	N
2	HRD	8578	0.887	HNH	CP	N	36	36	36	15	HC2	BDL	H	N
2	HRD	8578	2.445	HH	CP	N	18	18	25	10	MM	N	N	N
2	HRD	8578	2.360	HH	CP	SDC	18	18	29	10	MM	N	N	N
2	HRD	8578	0.219	HH	CP	N	36	36	30	5	HC	FH	N	N
2	HRD	8578	0.928	HNH	CP	N	24	24	30	5	HC2	N	H	N
2	HRD	8578	3.386	HH	CP	N	18	18	36	5	HC2	N	N	N
2	HRD	8578	3.511	HH	CP	N	36	36	30	5	HC2	N	N	N
1	PRD	6415	10.455	RB	PA2	BV	60	84	40	100	PA_PA	BVB	H	N
1	PRD	6415	10.458	RB	PA2	BV	60	84	40	100	PA_PA	BVB	H	N
1	PRD	6235	17.334	MT	CP3	SDC	36	36	44	50	PA_PA	BVD	M	N
1	PRD	6040	11.336	KK	PA	BV_SI	82	126	42	40	MM_MM	BVB_SI	M	C
1	PRD	6402	13.202	RB	CP	N	36	36	32	35	MM_PA	BVD	N	N
1	PRD	6420	0.783	RB	CP	RF	60	60	80	25	HC_MM	N	N	N
1	PRD	6420	2.087	RB	CP	O	48	48	40	15	MM_MM	N	M	N
1	PRD	6415	8.762	RB	CP	RF	48	48	40	15	MM_MM	N	N	N
1	PRD	6314	2.176	KK	CP	RF	36	36	48	10	NT_NT	N	N	N
2	PRD	6441	0.613	RB	PA	BVB	48	48	30	90	PA_PA	BVB	H	N
2	PRD	6402	18.149	RB	CP	SDC_WDC	48	48	34	90	PA_PA	BVB	H	C
2	PRD	6402	19.280	RB	CP	WDC	18	18	30	90	PA_PA	BVD	M	
2	PRD	6410	1.565	RB	CP	WDC	36	36	72	80	PA_HC	BV	H	N
2	PRD	6235	17.579	MT	CP	WDC_SDC	36	36	34	80	PA_NT	N	M	N
2	PRD	6030	11.712	KK	CP	SDC_DF_S	48	72	57	75	MM_MM	BDL_SF_SI	X	C
2	PRD	6333	1.069	KK	CP	SS_CSC	36	36	36	60	HC_HC	BDL_SF_SI	H	N
2	PRD	6435	0.942	RB	CP	WDC	48	48	32	60	MM_PA	BVB	M	N
2	PRD	6352	7.000	TK	CP	FS_DF	36	36	50	50	HC_HC	WDR_SF	X	C
2	PRD	6319	7.736	PB	CP	N	24	24	38	50	HC_HC	N	N	
2	PRD	6416	1.841	RB	CP2	WDC_MP	48	48	40	50	HC_HC	N	H	N
2	PRD	6416	2.348	RB	CP2	N	48	48	62	30	MM_MM	N	N	N
2	PRD	6430	1.173	RB	CP	RF	24	24	46	30	NT	N	N	N
2	PRD	6402	22.952	RB	CP	SDC	48	48	40	30	MM_MM	N	H	N
2	PRD	6402	19.268	RB	CP	WDC	36	36	44	30	MM_PA	BVB	M	N
2	PRD	6407	7.338	RB	CP	N	48	48	54	29		N	N	N
2	PRD	6434	4.497	RB	CP	O	36	36	34	28	MM_MM	N	N	N
2	PRD	6040	8.525	KK	CP	N	36	36	44	25	MC_HC	SF_SI_DR	H	C
2	PRD	6430	1.013	RB	CP	N	24	24	30	25	MM_MM	N	N	N
2	PRD	6438	0.385	RB	CP	SDC	24	24	40	25	MM_PA	BVD	N	N
2	PRD	6407	6.976	RB	CP	N	48	48	34	22		N	N	N
2	PRD	6420	1.578	RB	CP	MP	48	48	30	20	HC_HC	N	X	N
2	PRD	6317	2.112	PB	CP	MP_RF	72	72	44	15	HC_MM	N	N	N
2	PRD	46041	0.831	RB	PA	N		78	38	15	MM_MM	N	N	N
2	PRD	6407	1.743	RB	CP	N	24	24	37	15	MM_MM	N	N	
2	PRD	6434	4.716	RB	CP	O	36	36	40	15	MM_MM	N	N	N
2	PRD	6410	0.513	RB	CP	SDC	36	36	50	15	HC_HC	N	N	N
2	PRD	6416	1.842	RB	CP2	SDC_FP	48	48	40	15	HC_HC	N	H	N
2	PRD	6326	5.861	KK	CP	N	24	24	32	10	HC_HC	N	N	
2	PRD	6402	10.048	RB	CP	RF	24	24	30	10	HC_HC	N	N	N
2	PRD	6423	0.071	RB	CP	RF	48	48	40	10	PA_PA	BVU	N	N
2	PRD	6317	5.880	PB	CP	SDD	36	36	30	10	HC_HC	N	L	N
1	SRD	7624	0.106	CB	CP	SDC	36	36	40	100	FP			
1	SRD	7500	7.506	IR	CP	N	60	60	32	60	AF	N	N	N

VERIFIED FISH CULVERTS WITH BLOCKAGES BY DISTRICT

AHMU	DISTRICT	RTE_NO	MP	SYS	FEAT	FAIL	HGT	WID	LEN	BLK	CHT	SSC	A_REQ	PRI
1	SRD	7544	1.634	fi	CP	mp	24	24	26	25	fp	n	n	n
1	SRD	7624	0.712	CB	CP	N	48	48	36	2	MC	OT	X	C
2	SRD	7540	107.755	CB	CP	IB	36	36	47	100	N	OT	X	C
1	TRDN	3000000B	81.438	WP	CP	WX	48	48	50	100	ES	OT	H	EC
1	TRDN	1505300	0.215	KO	CP	BV	60	60	44	90	PA5	BVU	H	C
1	TRDN	1445000	3.123	HC	CP	BV	72	72	40	70	PA5	BVB	H	N
1	TRDN	3000000B	86.646	WP	CP	WDC	72	72		30	MM	OT	H	N
1	TRDN	1530000	2.249	KO	CPA	N	83	128	50	20	MM1	WDR	H	N
1	TRDN	2085000	3.147	LB	CP	N	36	36	44	5	AF1	N	N	N
2	TRDN	1445000	3.826	HC	CP	WDC	18	18		100	PA	N	H	N
2	TRDN	2086000	1.221	LB	CP	BV	48	48		75	PA5	BVB	H	C
2	TRDN	1500000	0.375	KO	CP	MP	36	36	40	75	ES	N	H	N
2	TRDN	2000860	1.828	LB	CP	MP	36	36	60	70	MM1	OT	H	N
2	TRDN	2000860	1.405	LB	CP	IB	36	36	40	60	MM1	OT	M	C
2	TRDN	2000900	0.474	LB	CP	BV	24	24	30	50	PA5	BVB	N	N
2	TRDN	2000000	134.694	LB	CP	MP	36	36	40	50	HC2	N	H	N
2	TRDN	2000810	0.300	LB	CP	MP	36	36	30	30	HC	N	N	N
2	TRDN	1480000	4.090	MAR	CP	RF	36	36	29	30	HC2	N	M	N
2	TRDN	2079000	7.488	LB	CP	WDC	36	36	30	25	MM1	N	M	N
2	TRDN	2085000	1.123	LB	CP	N	48	48	40	20	MM1	N	N	N
2	TRDN	3000000B	92.743	WP	CP	N	120	120	70	20	MC	N	N	N
2	TRDN	2084015	0.133	LB	CP	N	72	72	54	20	HC2	N	N	N
2	TRDN	1445700	1.102	HEC	CP	N	24	24	42	20	MM1	WDR	N	N
2	TRDN	2000810	1.107	LB	CP	N	36	36	40	15	PA	BVD	N	N
2	TRDN	2000000	108.011	WP	CP	N	36	36	48	15	HC2	BVD	N	N
2	TRDN	2085000	3.019	LB	CP	N	60	60	40	15	AF1	N	N	N
2	TRDN	2000000	125.242	WP	CP	N	48	48	60	15	MM1	N	M	N
2	TRDN	1470000	7.225	TUX	CP	SDC	60	60	85	15	PA5	BVB	H	N
2	TRDN	2000860	1.069	LB	CP	BV	48	48	40	10	PA	BVU	N	N
2	TRDN	2085000	2.649	LB	CP	N	60	60	38	10	AF1	N	N	N
2	TRDN	2085000	1.856	LB	CP	N	48	48	40	10	MM1	N	N	N
2	TRDN	2085000	1.168	LB	CP	BV	48	48	40	5	MM1	BVD	N	N
2	TRDN	2000850	0.392	LB	CP	BV	24	24	32	5	PA5	BVD	N	N
2	TRDN	2000860	0.715	LB	CP	N	36	36	40	5	MM1	N	N	N
2	TRDN	2085000	3.115	LB	CP	N	36	36	36	5	AF1	N	N	N
2	TRDN	2085000	2.659	LB	CP	N	48	48	40	5	AF1	N	N	N
1	TRDS	2000000	76.978	CC	CP	BV	60	60	56	80	PA	BVB	H	C
1	TRDS	3000000	58.860	CC	CP	SD	24	24	32	80	PA1		H	
1	TRDS	3015600	2.890	TB	CP	SDC	36	36	40	80	MM1	SD_FH	H	N
1	TRDS	3000000	48.610	CC	CP	MP	18	18	25	50	PA5		H	
1	TRDS	3030000	14.570	CC	CP	N	72	72	46	10	MM		N	
1	TRDS	3030000	8.310	CC	CP	N	48	48	35	10			N	
1	TRDS	3000000	47.630	CC	CP	WDC	48	48	30	10	MM1	N	H	
1	TRDS	2050610	0.700	WH	CP	N	60	60	40	5	MM1	FH	H	N
2	TRDS	2050300	7.000	ST	CP	SDC	24	24	30	100	MM	N	H	
2	TRDS	2050300	8.100	ST	CP	WDC	60	60	40	100	HC2	DR	H	
2	TRDS	3030000	5.830	CC	PA		72	95	46	60				
2	TRDS	3030000	11.200	CC	CP	SD	18	18	32	50	MM	N	N	
2	TRDS	2050400	3.350	ST	CP	SDC	36	36	40	40	HC2	N		C
2	TRDS	3030000	15.540	CC	CP	N	48	48	44	25	MM	N	N	
2	TRDS	3030000	19.020	CC	CP	FS	24	24	40	20	HC		H	
2	TRDS	3030600	0.030	CC	CP		36	36	35	20	MM1	N	H	N
2	TRDS	3000000	53.180	CC	PA	MP	24	30	36	15	HC2	N	H	
2	TRDS	3030000	0.050	CC	PA	EC	91	141	48	10				C
2	TRDS	2050050	0.820	ST	CP	MP	108	108	80	10	HC3		H	
2	TRDS	3030000	6.010	CC	PA	N	72	87	44	10			N	

VERIFIED FISH CULVERTS WITH BLOCKAGES BY DISTRICT

AHMU	DISTRICT	RTE_NO	MP	SYS	FEAT	FAIL	HGT	WID	LEN	BLK	CHT	SSC	A_REQ	PRI
2	TRDS	2050610	0.300	WH	PP	EC	36	36	40	5	MM1	N	H	N
2	TRDS	3030000	9.250	CC	CP	N	72	72	40	5	MM	N	N	
2	TRDS	3030100	0.250	CC	CP	N	18	18	30	5	HC2	SD		
2	TRDS	2050000	5.050	ST	CP	SDC	36	36	30	5	HC2	BDL		
2	TRDS	2057000	2.140	NA	CP		18	18	45	5	MM1	N	N	
2	TRDS	3030000	16.420	CC	CP	N	24	24	36	2	HC		H	
1	WRD	6590	26.858	ZA	AR	DC_BV_W	70	90	39	85	PA	B_WDR_FH	M	N
2	WRD	6590	26.624	ZA	CP	_SDC_WD	18	18	28	100	PA	BVB_FH_SI	X	N
2	WRD	6590	26.544	ZA	CP	C_WDC_A	36	36	38	60	PA	BVB_SI_SD	H	C
2	WRD	6265	7.693	wg	cp	c_wdd_sdd	48	48	48	60	hc	vdr_bdl_sf_	m	c
2	WRD	6265	4.516	wg	cp	sdc	48	48	41	25	mm	n	n	n
2	WRD	6265	2.515	wg	cp	n	48	48	30	20	mm	n	n	n
2	WRD	6590	27.907	ZA	CO	WDC	38	76	33	15	HC	O	M	N