

RAPTOR MANAGEMENT INFORMATION SYSTEM

NOTECARD SEARCH REPORT

Title of Search: Impacts -- Dams and Reservoirs

Date of Search: 11/3/83 Reference Cutoff Point: 6500

NOTE

1. Reports involving keywords and/or notecards include pertinent references and notecards from 1,500 papers (through reference number 6500). The RMIS currently includes 2,673 papers, but the last 1173 have not been read, keyworded, or had notecards developed for them. We are proceeding with that phase of system development.
2. Thus, this is not an exhaustive search of the system for the keyword requested. You may wish to ask for an updated keyword printout and associated notecards six months or a year from now for papers beyond number 6500.
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Management Recommendations
MGRDAM

Dams & Reservoirs

5047
Bald Eagles

Proposed Wintego Reservoir Below Reindeer Lake.

Changes in present fish populations, spawning grounds, and commercial fishing activities could affect the carrying capacity of the reservoir either positively or negatively for both bald eagles and ospreys. The Fisheries Study Sector's impact assessment would be consulted to determine whether fish populations and spawning grounds in the proposed reservoir would be significantly reduced. Fish-spawning sites are heavily utilized by bald eagles for acquiring food.

(over)

Barber, Stelfox, and Boden 1975

4
Management Recommendations Dams & Reservoirs
MGRDAM

5047
Bald Eagle

The most useful measure for the mitigation of losses of bald eagles would be the re-establishment of early spring open water sites where food might be obtained on the reservoir. If suitable materials and designs were used to restrict the downstream ends of narrow channels appropriate sites might be provided for spawning fish, further enhancing the food situation for bald eagles at this critical time of year.

Barber, Stelfox and Boden 1975

Management Recommendations -- Dams & Reservoirs
MGRDAM

5047
Bald Eagle

In order to reduce losses in the productivity of bald eagles and ospreys, no construction activities (such as shoreline clearing) should occur within one mile of nests during the nesting season from April 1 to August 15. Shoreline clearing operations should leave a block of forest one-quarter mile in radius around all nest sites that are active or in good repair. If they were not completely inundated, these nest sites might be used for some time during and possibly even after reservoir filling. Future nest sites that were established along the new reservoir shoreline should receive similar management and protection. Islands of trees of one to three acres, left standing in water, might provide increased nesting sites for ospreys (but not bald eagles).

Barber, Stelfox, and Boden 1975

The major impact on resident bald eagles would be caused by the greatly reduced availability of food supplies in the early spring as a result of the flooding of rapids and other fast-flowing sections of the river. The results of CRS Wildlife Study Sector's studies and those at Besnard Lake show that open water associated with rapids and riffles provides critical access to food supplies during nesting and incubation in April and early May (pers. comm. Gerrard).

Barber, Stelfox, and Boden 1975

Impacts

Dam Construction

5047
Bald Eagle

The decreased carrying capacity of the proposed Wintego reservoir and the consequent loss of approximately 30 breeding pairs of bald eagles is very significant.

The significance of this potential loss is even greater in a national and international context. The bald eagle has been eliminated from much of its former breeding range in the southern and eastern portions of this continent and is regarded as being endangered in many other areas, including Manitoba. Developments such as the proposed Wintego hydro-electric project could quickly reduce Saskatchewan's population.

Barber, Stelfox, and Boden 1975

Impacts

Dam Construction

5047

Reindeer Lake. Most of the bald eagles known to nest in this area do not nest immediately beside the lake but are found along tributary drainages that have early spring open waters and accessible food sources. Even a rise of two and one-half feet would have no appreciable effect on bald eagles or ospreys nesting near or on the lake.

Barber, Stelfox, and Boden 1975

Impacts

Dam Construction

5047
Bald Eagle

The Wintego hydro-electric project would have a negative impact on most species of birds and mammals that utilize aquatic habitat, and a strong negative impact on those species for which the Churchill and Reindeer Rivers presently constitute good habitat. The major reason for this would be the transformation of the two large rivers into an ecologically dissimilar reservoir characterized by an unnatural water regime, and the associated loss of important rapids and marsh habitats.

Barber, Stelfox, and Boden 1975 (COVER)

It is estimated that the bald eagle population in the reservoir area would be reduced by about 100 birds (75 per cent). Ospreys are unique, in that they might benefit from the project. The Churchill River supports the highest density of breeding bald eagles in Saskatchewan. The loss of these birds would also be significant on a continental basis, as it is estimated that Saskatchewan supports the largest breeding population of bald eagles in North America next to British Columbia and Alaska. For these reasons, the potential impact on bald eagles must be regarded as the most ecologically serious on any species.

Barber, Stelfox, and Baden 1975

Impacts

Dam Construction

5047
Bald Eagles

At the present time there are 41 occupied breeding areas along the approximately 900 shoreline miles that would be flooded. Because of the greatly reduced availability of food supplies in the spring, this density of 4.6 breeding areas per 100 shoreline miles would ultimately fall to a maximum of 1.0 based on the breeding density (0.6) observed on the upland lakes and streams adjacent to the main river system. This means that the proposed reservoir south of Reindeer Lake (which would have 1,100 shoreline miles) would support approximately 11 occupied breeding areas, a decrease of 73 per cent from the present population level. A drop in population of 100 birds (including immatures and young of the year) could be expected, assuming that adults comprise 61 per cent of the population as suggested in Chapter 4.

Barber, Stelfox, and Bodan 1975

Impacts

Dam Construction

5047
Ospreys

It is unlikely that there would be any significant direct impact on ospreys. No known nests would be flooded. Ospreys do not arrive in the study area to begin nesting until mid-May, when some open water would probably exist in the reservoir. These birds might even increase in the study area if some flooded trees were left; they will readily utilize emergent dead snags for nesting, as observed on the Island Falls reservoir (Sokatisewin Lake) and Reindeer Lake.

Barber, Stelfox and Bodan 1975

Impacts

Dam Construction

5047
Bald Eagle
Osprey

Downstream From the Wintego Dam.

The carrying capacity for bald eagles on the Churchill River below the Wintego dam would not be altered appreciably. Rapids and early spring open water would remain; immediately below the damsite, in fact, a considerable stretch of open water would likely be maintained throughout most of the winter because of sudden large changes in the volume of outflow associated with power peaking.

An indirect impact to bald eagles and ospreys might result from decreased fish populations below the dam. The Fisheries Study Sector's impact statement should be consulted on this.

Barber, Stelfox, and Bodan 1975

Impacts

Dam Construction

5047
Bald Eagle
Osprey

Transportation and Transmission Line Routes.

Both bald eagles and ospreys could suffer decreased productivity because of the increased human activity that would result from construction and improved access. These birds are particularly sensitive to human activity in proximity to nest sites during the nesting season (April 1 to July 31) (see Chapter 4).

Barber, Stelfox and Bodan 1975

Impacts

Dam Construction

5047
Bald Eagle

As the bald eagle prefers to nest along lake and river shorelines, 12 (19 per cent) of the 69 nest trees above the damsite would be completely flooded, and 38 (55 per cent) would be partially flooded. It is not known whether these birds would continue to nest in trees standing in several feet of water. Birds using nest trees that are completely inundated would of course have to relocate their nest sites in proximity to the newly created shoreline or move elsewhere. As bald eagles are known to nest at the same location from year to year, there would likely be decreased productivity as birds set up new nest sites and territories during and shortly after reservoir filling. Temporal disturbances such as nest tree flooding would not affect the long-term carrying capacity of the proposed reservoir, however.

Barber, Stelfox, and Boden 1975

Impacts

FRENCHMAN'S FLAT DAM DISCUSSED

5108
Calif. Condor

The Frenchman's Flat dam proposal was discussed by representatives of the Angeles and Los Padres National Forests, California Dept. of Fish & Game, U.S. Fish & Wildlife Service, Calif. Dept. of Water Resources and the National Audubon Society. The dam was proposed some years ago by the Angeles National Forest as part of the mitigation for the Pyramid Dam portion of the State Water Project.

The Condor Recovery Team has come out in opposition to the project on the grounds that the effects of the construction of the dam are unknown as it relates to condor nesting downstream of the dam-site. John Borneman, Condor Naturalist for the National Audubon Society stated that "Because of the desperate plight of the condor and the possible negative impact on one of the few nest sites used within the past five years, the National Audubon Society opposes the construction of the Frenchman's Flat dam."

Borneman urged the Forest Service to explore alternative sites for the proposed recreation area and emphasized the fact that the condor cannot be forced to look for alternative nest sites. He observed that "the U.S. Forest Service has taken the lead, to date, in condor preservation" and urged them to continue to do so. Sanford Wilbur and Vic Tanny, Jr. of the U.S. Fish & Wildlife Service, also urged the Angeles Forest to actively pursue the alternatives to the dam. Audubon's condor naturalist also pointed out that in light of the proposed commitment to captive propagation of condors it is of critical importance that existing condor nesting habitat be preserved to keep present and future nest sites available in the event condors can be reintroduced into the wild following captive propagation.

Borneman, 1979

Mgmt. Recommendations Dams & Reservoirs
MGR DAM

5091
BALD EAGLE

- 4) Enact shoreline closures on either side of occupied peninsula during
4 major drawdowns to prevent recreational disturbance of nesting
eagles.

BOGENER 1980

Mgmt. Recommendations Dams

6324
BE

EID also proposes use of Alder Creek Reservoir as nesting habitat for bald eagles. Considering that bald eagles currently nest at least a hundred miles north of the Eldorado and that the trend has been toward abandonment of more southerly nests, it seems very unlikely that a pair would establish at the reservoir naturally. The proposal to release young eagles with no territorial attachments may succeed; chances would be greatly improved by release of more than 1 pair. Prey base may be limited; there is very little waterfowl use of similar lakes on the Forest; a substantial fishery of surface feeding fish will be required.

Schoenholtz 1980

Impacts

Dam Construction

Harris' Hawk⁵²³³

The primary factor causing the decline and extinction of Harris' hawks along the Colorado River was probably habitat degradation, most significantly from dam construction. By the 1930's and 1940's, salt cedar (Tamatrix pentandra) competition with cottonwoods had begun as a result of water level stabilization resulting from dam construction. The salt cedar's burn cycle of 10 to 20 years also reduced habitat for cottonwood regeneration. This probably reduced nesting habitat for Harris' hawks. Presently, there are about 200 hectares (500 acres) of pure cottonwood stands remaining from an estimated 2000 hectares in the 1600's (Ohmart 1977 In: Whaley 1979). The dredging of the Colorado River in the 1950's by the Bureau of Reclamation may have also influenced this population decline

Conrad 1979 (over)

cont.

5233

(Whaley 1979). Mallette and Schlorff (1979) add that the clearing of riparian areas and mesquite woodlands for agriculture probably increased the rate of decline of Harris' hawks.

Conrad 1979

Impacts

Dams

5250
Bald Eagle

Although it appears that the reregulating dam reservoir will not freeze in winter, the construction of the reregulating dam will reduce bald eagle habitat in an ice-free area by removing perch trees, river bars, gravel bars, and islands.

5250 Craighead and Craighead 1979

Impacts

Dam Constructions

5250
Bald Eagle

The Kootenai River in the U.S. presently supports one known pair of nesting bald eagles. This pair may have relocated at the present site since the flooding of the river bottom behind Libby Dam. However, the nest is adjacent to the original river channel and does not appear to be a new structure. USFS records indicate that 2 or 3 nests may have been present prior to dam construction and then inundated.

5250 Craighead and Craighead 1979

Impacts

Dams

⁵²⁵⁰
Bald Eagle

If the LAURD habitat were lost, the bald eagle population as a whole would tend to adjust by repartitioning the remaining habitat. Over the entire drainage system some eagles may be lost from the population.

5250 Craighead and Craighead 1979

Impacts

Dam Constr.

⁵²⁵⁰
Bald Eagle

1. Construction of the reregulating dam and reservoir will destroy roughly 90 percent of hunting perches currently used by migrating and wintering bald eagles in the proposed LAURD reservoir and dam area. Of 21 preferred perch sites, 17 will be destroyed.

5250 Craighead and Craighead 1979

Impacts

Dams

Bald Eagle 5251

Construction of the reregulating dam would reduce the food supply for both migrating and wintering eagles. Most importantly, the mountain whitefish spawning run up the Fisher River would be blocked, and this food source may be lost to migrating eagles. In the broad picture, the LAURD project will reduce the amount of remaining bald eagle habitat in a drainage system that had already lost much

5250. Craighead and Craighead 1979 (over)

habitat, and in which more impoundments and other development projects are planned. Although it is a small segment of river, the LAURD project is a segment that is utilized by wintering bald eagles. Because much similar habitat has already been lost, the LAURD area can be considered an essential part of the system as a whole.

Craighead and Craighead 1979

Impacts

Dam Constr.

Bald Eagle ⁵²⁵⁰

5. Any construction and clearing activities that take place during the time bald eagles are present will interrupt their activities and restrict their use of the river and immediate shore environment.

5250 Craighead and Craighead 1979

Impacts

Dam Construction

Bald Eagle ⁵²⁵⁰

It is difficult to see how any great change in migration pathways could have taken place in the short time since the construction of Libby Dam.

5250 Craighead and Craighead 1979

Impacts

Dams

5250
Bald Eagle

2. Aquatic invertebrates and fish in the reach of the Kootenai River to be inundated by the reregulatory reservoir will be adversely affected. In particular, the spawning run of whitefish destined for the Fisher River will be blocked from movement upstream past the reregulating dam, and this important food source for the bald eagle will be markedly reduced.

5250 Craig head and Craighead 1979

Impacts

Dams

5262
BE

Much has changed over the years in the valley of the upper Skagit River. Farms, ranches, and small towns have replaced much of the ancient forest. Three hydroelectric dams have blocked the salmon from some of the upstream spawning areas. Downstream, agriculture and logging changed water temperatures, covered spawning gravel with silt, or washed out the beds entirely with erosion-caused floods.

Through it all (and despite periodic setbacks) the water quality of the upper Skagit has remained high. But the overall impact of man's activities, including the increasing pressures of commercial fisheries, has led to a steady decline of both salmon and eagles.

Davis 1976

Impacts

Down

Spring

5416

Kahl (1971) believed that the apparent increase in Ospreys at Eagle Lake from 1905 to 1925 probably was related to the large numbers of snags produced when trees were killed as the lake level rose naturally about 12 feet from 1880 until 1915. The rising lake submerged and drowned trees over an extensive area around the south and west shorelines. This area later was exposed when the lake level dropped in 1917. The snags offered ideal nesting habitat for Ospreys. Since the shoreline flooding of Eagle Lake over 60 years ago, the disintegrating forces of nature, aided by man, have reduced considerably the numbers of standing snags. Kahl (1971) believed the reduction in numbers of Ospreys at Eagle Lake probably was associated with the decline in nesting snags. We concur, and further believe that the shortage of nest sites at Eagle Lake forced the progeny to look for other locations at about the time reservoirs were being constructed throughout the interior of northern California (see construction dates mentioned earlier). The counts of nesting pairs have ranged from 18 to 24 between 1969 and 1975. Probably there are currently more Ospreys at Eagle Lake than between 1900 and 1915, but fewer than between 1915 and 1925.

HENNY 1978

Impacts

Reservoir Mgmt.

5607
Osprey

Reproductive success at the Dead Stream Flooding was also low during the mid-1960s (Table 4). The total failure of this colony in 1964 coincided with a drawdown of this impoundment that spring as a water-fowl-management measure by the Michigan Department of Natural Resources.

Thirty-seven percent of known eggs ($N = 303$) hatched, and 32% resulted in fledged young. Of young that hatched ($N = 112$), 88% fledged. This is very close to nestling survival of 86% ($N = 590$) in Chesapeake Bay reported by Reese (1970). I do not believe that the heretofore very limited experimental application of my "foster parents plan" had altered this percentage appreciably. The effect of our artificial nesting platforms is difficult to measure in absence of a control group.

Postupalsky 1977

Impacts

Dams

5667
California Condor
Everglade Kite

The economic impacts of raptors are more diverse than their effects on game and livestock. For example, the conflicts that have developed in California between proponents of preservation of the condor and mining and dam-building interests have been severe (see Sibley 1969). Similarly, the saving of the everglade kite in Florida is going to mean that water supplies and enough habitat will have to be guaranteed. The severe competition for water and land in this state can only mean that some interests will have to face economic restrictions if the kites are to be saved. Such habitat-related conflicts of interest can be expected to increase in the years ahead.

+Snyder
Snyder, 1975

Impacts

Reservoir mgmt.

5667
Everglade Kite

Thus it appears that management of aquatic habitats for everglade kites must entail practices which maintain water levels and control the spread of surface aquatic vegetation, principally the water hyacinth. Control is complicated because of a progressive enrichment of freshwater marshes of Florida from agricultural and other practices. Although the snails appear to be able to tolerate excessively ripe water conditions, the same conditions predispose the marshes to clogging masses of surface aquatic growth. Thus the quality of water entering the marshlands is as important as its quantity, and both are currently being stressed to near capacity. Continued growth of the human population in southern Florida can only exacerbate the difficulties.

+Snyder
Snyder, 1975

Impacts

Reservoir Mgmt.

5850
BE

An important factor in bald eagle ecology of Snasta Lake is the management of the reservoir. Fluctuation in the water level has affected many life forms in and around the lake.

Detrich 1977

Impacts

Reservoir Mgmt

5850
BE

Positive changes included: 1) increased forage availability due to concentration of the fishery and possible higher fish mortality rate, 2) increased forage availability due to creation of river "deltas", and 3) creation of buffer zone between nests and human recreation on the water below.

Negative changes included: 1) creation of vehicle access to some nest sites, 2) an increase in distance and elevation carrying fish from water to nest, and 3) possible abandonment and relocation of a nest territory due to loss of water near the nest.

In addition, the lowered water caused changes in the pattern and density of human recreation on the lake. These changes had both positive and negative effects.

Detrich 1977

Impacts

Reservoir Mgmt.

5850

BE

The Bureau of Reclamation has indicated that due to an increase demand for water, a new pattern of water management may arise in the future. Even with normal rainfall, the agency expects a water use pattern which would include a greater yearly drawdown, and a regular drawdown similar to that which occurred this year. Recreational planning on this basis has already begun -- relocation of some of the marinas in the upper arms is currently being planned by the Shasta Lake Ranger District.

Projections as to the effects of this type of lake management is clouded by many other variables, but a pattern of fluctuations in eagle production may be expected. During low water and low recreation years, such as in 1977, bald eagle production is expected to be high.

Detrich 1977

Impacts

Reservoir Mgmt

5850

BE

Apparently three factors combined to create good forage conditions this year, all related to the falling water levels in Shasta Lake.

First, the fish population was forced to adapt to decreasing habitat. Department of Fish and Game, Region 1 Inland Fisheries personnel, do not believe there was a big increase in fish mortality, but the population was more concentrated. However, with a drop in lake volume to $\frac{1}{2}$ of full pool, reached in May, at least a slight increase in the mortality rate seems likely.

In any event, the concentration of the fishery was probably a positive change for the bald eagles. Surface area on May 1, 1977 was 42 percent of full pool level. Whether or not the fish mortality increased, all the dead fish were presented over a smaller surface area. If the fish mortality rate increased, more forage was available.

Detrich 1977

Impacts

Reservoir Mgmt.

5850
BE

Second, the falling lake levels brought about the creation of "delta" areas on the tributary streams, which became important bald eagle forage areas. These were formed as the lake level fell. Beds of accumulated sediment were exposed and caused streamflows to spread out over the mud bars. These deltas existed on all four major arms of Shasta Lake. They have probably occurred on a much smaller scale in the past but never before have the lake level and streamflows been so low.

Detrich 1977

Impacts

Reservoir Mgmt

5850
Bald Eagle

The increase in productivity of bald eagle fledglings on Shasta Lake in 1977 can apparently be attributed to reservoir management which adversely affected the fish populations and human recreation use.

Detrich 1977

*Impacts**Dams**Peregrines*

Presently the valley is inundated by a large lake which at high water is within a very few meters of the top of the cliff. Before the lake, this site commanded a view of a valley nearly 2 km wide and easy access to floodplains in three directions.

Anderson + Burnham 1978

*Impacts**Dams*

Two dams—one existing, the other proposed—could also affect the Natural Area. A joint venture of the Idaho Power Company and the Idaho State Department of Water Resources, the dam project calls for increasing the height of the already existing 24-foot dam at Swan Falls by 40 feet and for construction of a 40-foot lowhead regulating dam some 12 river miles downstream at Gutley Butte. The Swan Falls-Gutley project, planned for several years, has been likened to a campfire—it flares up now and then but "never really cooks the pancakes." However, environmental impact studies are now underway prior to application to the Federal Energy Regulatory Commission.

The probable effect on the birds of these alterations? Loss of habitat for riverbank nesters, particularly long-eared owls and marsh hawks. Songbirds, a secondary food source for the cliff-dwelling falcons, will also lose their low-lying habitat. A 40-foot change in the water elevation will bring boaters closer to the canyon walls, disturbing the ledge-nesters, particularly prairie falcons. Moreover, the cliff-nesting fledglings making their first night flight will end up in the water, rather than on the steep slopes or at the foot of the cliffs.

Haley 1978

*Impacts**Dams*

- A dam and reservoir known as Swan Falls-Guffey has been proposed by the Bureau of Reclamation and the state which would inundate part of the natural area and could increase human disturbance of nesting raptors. Swan Falls-Guffey plans is exempt from the protective withdrawal, according to BLM.

Hamilton 1976

*Impacts**Reservoirs**Spotted Owl*

Although Blue River Reservoir was partially drained during the winter, exposing extensive mudflats and gravel bars, foraging was never observed within the exposed area or on the grassy slopes bordering the reservoir.

Foroman 1980

Impacts

Reservoir Mgmt.

6015
BE

In 1938, what was then the Michigan Department of Conservation initiated fishery surveys of Sucker Lake and discovered the lake was subject to winter kill. In 1960, State Biologists in Michigan recommended a dam be built to increase the lake level 10 feet thus creating conditions to eliminate winter kill. Concerned about the effect of raising the lake level on the population of the bald eagles repeatedly using the area, the Ottawa National Forest Supervisor's Office allocated funds and requested that North Central Forest Experiment Station conduct a study in the area.

Mattson 1974

Impacts

Reservoir Mgmt

6019
Osprey

The Osprey population evidently remained at seven pairs until 1964. A drawdown maintained throughout spring and summer of that year coincided with a total nesting failure in the resident Ospreys. Only six pairs returned in 1965 and 1966, and some of these nested on very low stumps.

In: 6013
Postupalsky 1974

Impacts

Dams

62-97
BE

[As far as we can tell from the present distribution and habitat use patterns displayed by breeding eagles in central Arizona (Hildebrandt unpubl. MS thesis, Sell unpubl. MS thesis), inundation of large portions of the riparian habitat by reservoirs would effectively eliminate any nesting in those areas.

OHMART, R.D. AND R.J. SELL, 1980.

Impacts

Dams

62-97
BE

Breeding adults have been observed flying above the dam, but few observations have been recorded that indicate that the reservoir plays an important role in providing a prey base for this pair. However, it must be kept in mind that the reservoir was drained and refilled in 1978, which

undoubtedly reduced the abundance of fish.]

OHMART, R.D. AND R.J. SELL, 1980.

Impacts

Dams

6251

BE

The proposed construction of Orme Dam and its possible impact on this pair is always a question. General data on the response of eagles to man-made reservoirs in Arizona and specific data on this pair support the thesis that construction of Orme Dam would have a negative impact on the nesting pair.

OHMART, R.D. AND R.J. SELL, 1980.

The severity of the impact would depend on many variables, but an important one would be the extreme and mean level of the reservoir from November through July. Caution and concern should be used in predicting how the McDowell pair would respond if much of the foraging area and some nest sites were inundated. Also, it is unreasonable to assume that mitigation of such extreme habitat loss is possible with our current state of knowledge about eagles.

Ohmart and Sell 1980

Impacts

Dams

6282

BE

The rumored nest site at Beardsley Reservoir was reported by Tri-Dam employees who work at the dam site. The reported nest was situated approximately 300 feet down river from the Beardsley Afterbay Dam. It has since fallen, apparently toward the river and all evidence of the reported nest has since been washed away. Adult bald eagles fishing in the afterbay have been seen by Tri-Dam employees virtually every year, until 1979 when only one adult was reported. Vegetative characters below the afterbay appear very suitable, particularly on the southside of the river; the reported nest was on the north side of what appeared as a "less suitable" stand type.

Peterson 1980

Impacts

Dams

6291

BE

Currently there are more fish species and greater numbers of fish available in the size classes of fish that are being harvested by Breeding Bald Eagles. This change in the fish fauna may well have shifted the ecological balance from intermittently suitable habitats for breeding eagles to relatively stable breeding habitats. Reducing water turbidity by impoundments and stabilizing water flows in the river systems may also have contributed to better fishing conditions and a more stable prey base for eagles.

SUPERCEDED BY:

Ohmart +
Sell 1980

Ohmart + Sell 1979

Impacts

Dams
Boating

6324
BB

Area 2 receives the most use by eagles of all the high use areas. It usually has 2 or 3 birds in it during peak use periods, but rarely more than 5. The perch trees and the shore line are used for both hunting and feeding. The rocks of the dam are used substantially, mostly in the early morning. (SMUD pers. comm.) Eagles flushed from near the dam in Area 1 will often cross the lake and perch in Area 2.

Area 3 is also used primarily as a refuge from disturbance. Normal perching use is limited. Birds flushed from Area 1, especially by boat, will usually go to one of the inlets. If the boat follows, the eagles will continue from one inlet to the next.

Schoenholz 1980

Impacts

Dams

6324
BE

The project sites for the Ice House-Jones Fork project were visited with SMUD representatives on 11 Feb. 80. The powerhouse and gatehouse (Figure 10) have the potential to disturb the bald eagles. The gatehouse will be located in a moderate use area, but human activity around it will be limited. Very little disturbance from hydroelectric operations will occur here. The possibility exists of increased recreational use following plowing the road for access. If recreation creates an unacceptable level of disturbance a gate may have to be put on the road.

Schoenholz 1980

Impacts

Dams

6324
BE

The powerhouse will be located near Union Valley Area 4, where the eagles are very sensitive to human presence. The proposed site is well screened by bends in the creek and by the forest, perch tree UV21 is barely visible through the trees, at a distance of about 350 yards. As long as the construction season is restricted as planned and the screening trees (on Michigan California Lumber Co. land) are maintained, little disturbance is expected.

Schoenholtz 1980

Impacts

Dams

6324
BE

Hydroelectric operations cause very little disturbance. Personnel are usually in a vehicle or building, reducing or eliminating their visibility to the eagles. Operations usually take place only a few hours per day on an irregular basis.

Schoenholtz 1980

Wgmt. Recommendations

Dams

6324
BE

Alder Creek Reservoir is planned to be built about 7 miles south of Ice House. The reservoir will have approximately 1,700 surface acres with a spillway elevation of 5,450 feet. Wintering habitat will be created by the reservoir, but will probably not be as desirable as Crystal Basin reservoirs. Unless kokanee are planted, which are the chief attraction at Crystal Basin, Alder Reservoir will probably receive use like Lower Bear Reservoir, which is similar in elevation and topography. Semi-submerged snags may be left as an attempt to attract bald eagles. The snags will give structure and cover for the fish, and will probably be used as hunting perches in some instances. It should be noted that only 25 percent of the perch trees elsewhere were snags. A large number of snags may be a flying impediment to birds with a 6-7 feet wing span.

Schoenholtz 1980

Impacts

Dams

Calif. Condor ⁶³²⁵

IN 1964, WHILE THE McMILLANS were finishing their report, a new condor crisis arose—a proposal to dam Sespe Creek. This project, including a large reservoir just north of the sanctuary and a road through it, would bring thousands of visitors a year and every conceivable disturbance into the heart of the condors' homeland. The National Audubon Society took the lead in a bitter battle to stop the project. The issue brought the condors to the center of public attention while the pros and cons of preserving "forty dirty black birds" were argued from all points of view. At last, in 1967, the dam was defeated when voters turned down a bond issue. By then a great many changes had taken place in the management of the condor.

McMully 1978

Impacts

Dams

Red Kites ⁶⁵⁵¹

The building of reservoirs is similarly unlikely to have had any adverse effect on kites. The flooding of sheepwalk (or in one case farmland) has reduced the foraging areas, and the waters themselves offer little food in return, for it is a rare event to see a gull or duck on any of them. But these reservoirs have occupied only a tiny fraction of the land available to kites, and most are far removed from nesting areas. They may, however, have contributed to the growth of tourism in the region. Since 1945, many old hill-tracks have been surfaced for motor traffic, so that large areas (including traditional nest-sites) which were previously inaccessible to most people are now visited by large numbers of tourists through the summer months.

Newton, Davis, + Moss 1951

Impacts

Dams + Reservoirs

6375
BE

In the multiple use of the BLM-administered lands lies the enormous potential for conflicts. For example, there are eight communal roosts along the ice-locked Yampa River; the eagles hunt in adjacent upland areas to find rabbits and dead deer. The two roosts with the highest usage levels will be eliminated if two dams proposed for the area are built.

Olson 1975

Impacts

Dams

6431
Calif. Condor

To summarize, the Sespe Creek Project would present a danger to condor survival. The total project as proposed would probably mean the loss of the condor. Modifications of the project would still produce serious detrimental effects. Restrictions on use of the reservoir would reduce the detrimental effects, but prohibiting this activity would probably be temporary and eventually would almost certainly be rescinded under public pressure. The Sespe Creek Project can only be judged as being unacceptably detrimental to condor survival. The extinction of the condor would be an almost certain consequence.

Sibley 1969

Impacts

Dams

6431

Calif. Condor

Construction of the Topatopa Dam portion of the Sespe Creek Project with access via the Squaw Flat Road and full recreational development would likely doom the condor. Seven nest sites and as many important roost sites would be abandoned. A large portion of the prime nesting range would be rendered unsuitable because of traffic noise on the access roads. The present Sespe-Piru area would be split into smaller blocks of wilderness habitat that would be less valuable or even useless. Hunting and other recreational use of the area would increase the annual loss of condors, and would disturb additional nesting and roosting sites to an intolerable degree. Loss of this area would result in a great restriction of useable roosts and nest sites and thus reduce the population, which would have no place else to go.

Sibley 1969.

Impacts

Dams

6431

Calif. Condor

The Oat Mountain Diversion Dam and Sespe Conduit would have little predictable effect on condors. Construction of Cold Spring Dam would create little or no disturbance to condors, but recreation attributable to operation of the reservoir would create serious disturbance in condor areas downstream.

Sibley 1969.

Impacts

Dams

Calif. Condor

6431

The Sespe Creek Project will affect the area in two main ways: (1) Noise associated with construction and use of the project and (2) increased human use because of improved access to the Sespe-Piru area.

The noise produced by construction of the access roads, traffic on the roads, and construction of the dam would all be of approximately the same magnitude. Keast (1965) reported for the United Water Conservation District on the noise environment of the California condor: he gives measurements of normal background noise and "median" airplane noise in the sanctuary, and compares these with construction noise (Table 1).

Sibley 1969 (over)

Table 1. Noise Levels Produced by the Sespe Creek Project

Noise Source	Noise Level	Distance at Which the Noise Exceeds:	
		"Median Plane"	Normal Background
Construction	85-85 decibels	3,200 ft.	19,000 ft.
Traffic	530 vehicles per hour	4,600 ft.	7,800 ft.
Heavy Trucks	85-65 decibels	8,200 ft.	19,000 ft.
Blasting	130-140 decibels	30,000 ft.	

Sibley 1969

Impacts

Dams

6465
Bald Eagles

Potential flooding of habitat by new water impoundments may also result in habitat loss. The lack of observed use of reservoirs by Arizona's Bald Eagles suggests little or no benefit from newly constructed impoundments, although this point needs further study.

Hildebrandt + Ohmart 1978

Impacts

Dams

6465
Bald Eagles

Sound eagle management in central Arizona appears to call for a halt to or wise placement of water impoundments. Eagle use of impoundment areas seems to confer a great deal less benefit to the population than the damage inflicted through habitat loss.

Hildebrandt + Ohmart 1978

Impacts

Dams

6465
Bald Eagle

Two nest

sights were located near major water impoundments but did not actually overlook these impoundments. Actual use of water impoundments by resident eagles has not been observed, although drainage of Bartlett Reservoir and the loss of the nest near Horseshoe Reservoir prevented observations on this question. The free-flowing portions of the river appear to be of maximal importance to the resident Bald Eagles, as evidenced by their selection of nest site locations.

Hildebrandt + Ohmart 1978

Impacts

Dams

BE

Since a Copper Creek Dam would eliminate resources capable of supporting rather large numbers of eagles in some years, it must be regarded as a significant negative contribution to overall carrying capacity. Until a measure is obtained of the carrying capacity of the region and the rate at which resources are diminishing relative to eagle population requirements, a complete assessment of dam impacts will not be available.

Hunt + Johnson 1981

Impacts

Dams

6467

BE

Wintering eagles on the Skagit are an asset to local businesses since considerable numbers of people are annually drawn to observe eagles at the Skagit River Bald Eagle Natural Area (see Skagen 1980). A dam-caused reduction of eagle numbers would presumably render the area less attractive to eagle watchers.

Hunt + Johnson 1981

Impacts

Dams

6467

BE

A Copper Creek Dam would impact eagles most severely in years in which a synchrony of low salmon carcass availability occurred among most or all of the major river wintering sites in the region. In winter 1980-81 flooding greatly reduced eagle food supplies on three of the four rivers studied.

Hunt + Johnson 1981

Impacts

Dams

6467

BE

Puget Sound was identified both circumstantially (through regional shifts in eagle concentration) and directly (radio-tracking) as a potential absorption area for eagles expelled from the Skagit by a Copper Creek Dam. However, data are still insufficient to conclude whether such eagles migrating to Puget Sound (or elsewhere) there. Since eagles wintering at Puget Sound must, to some extent, actively hunt for food, the younger age classes may experience malnourishment or starvation, while older birds, adept at fishing and hunting skills, are more likely to survive. We speculate that adults, forced from the Skagit, may, in some years, be unable to amass sufficient resources for breeding.

1981

Hunt + Johnson

Impacts

Dams

6467

BE

Measurements of salmon carcass availability in the SRSA by direct counts and by fish tagging and recovery when compared with projections of eagle occurrence, verified that habitat in the PIA, SRSA, and the entire Skagit drainage was saturated by eagles in 1980-81. The consequence is that dam-displaced and -deprived eagles would be forced from the Skagit drainage in some years. In at least four of the past eight years eagles have likely been at saturation levels on the Skagit.

1981

Hunt + Johnson

Impacts

Dams

6467

BE

Two classes of eagles that would be impacted by a Copper Creek Dam are recognized: those displaced by inundation of habitat and those deprived by loss of food downstream. Based on an experiment involving live salmon disk-tagging and carcass recovery, we estimate that a Copper Creek Dam would eliminate food that would have supported a minimum of 11 eagles downstream of the dam site in a year in which conditions were similar to those of 1980-81. Additional eagles would be deprived if a dam were to degrade (e.g., by "armoring") salmon habitat in downstream areas.

1981

Hunt + Johnson

Impacts

Dams

6467

BE

Briefly, a Copper Creek Dam would inundate habitat that was occupied by about 40 bald eagles in late winter 1979-80. The County Line Ponds-Whistling Hole complex, an important spawning area for coho and chum salmon in some years, would be lost to inundation along with 50 class-A deciduous perch trees and 20 gravel bars. In addition, salmon would no longer drift out of the area of proposed impoundment to become available to eagles downstream. Predicted dam-related increases in human disturbance levels would affect eagles during stress years primarily by flushing them from feeding bars.

Hunt + Johnson 1981

Impacts

Dams

6467

BE

Hunt et al (1980) determined that up to 40 eagles would have been displaced from the area of proposed impoundment had a Copper Creek Dam existed during the winter 1979-80. In Section 3 of the present report we show that an additional eleven or more eagles would be deprived of salmon no longer drifting below Copper Creek from spawning areas above that point. Finally, an unknown number of eagles might also be deprived by degradation of spawning substrate and harmful flow fluctuations stemming from a Copper Creek Dam (Hoopes and Edson 1980). In sum, we may expect that a Copper Creek Dam would force at least 50 eagles to reside outside the Skagit drainage during some winters. From another standpoint, the environment outside the Skagit drainage would have to support the 50 or more additional eagles.

Hunt & Johnson 1981

Impacts

Dams

6467

BE

A consequence of this saturation of habitat is that eagles displaced or deprived by a Copper Creek Dam could not have remained in the Skagit drainage in a year in which conditions were similar to those of 1980-81. Such years are common on the Skagit. Table 3b indicates that there have been four winters within the last eight when low food supplies must surely have dictated an upper limit to the numbers of attendant eagles. Had Seattle City Light made its impact investigations in such a year, it would have concluded that eagles displaced by a dam at Copper Creek would have been comfortably absorbed into rich areas downstream.

Hunt & Johnson 1981

Impacts

Dams

6467

BE

The relationship of bald eagles wintering on the Skagit River to their occurrence in the Northwest region and elsewhere is critical to the examination of impacts by a Copper Creek Dam. In Section 3 of this report we established that during winter 1980-81 the habitat of the SRSA and of the entire Skagit drainage was saturated with eagles; that is, limited food supplies would not have supported additional eagles. The conclusion was based on measurements of the amount of food present, rates of salmon carcass deposition, and computations of the numbers of eagles present.

1981
Hunt + Johnson

Impacts

Dams

6467

BE

In summary, our data from carcass surveys and fish tagging supports the conclusion that bald eagles were at or very near carrying capacity in the SRSA and even in the entire Skagit River drainage especially after the middle of January. We believe this was true in both 1979-80 and 1980-81 because of the similarity of conditions we observed during these winters.

The implications of habitat saturation as regards the building of a Copper Creek Dam is that eagles displaced by inundation or deprived by loss of drifting salmon would not find food in the SRSA or in other parts of the Skagit drainage during years in which conditions are similar to those of 1979-81. Using radio telemetry Hunt et al (1980) showed that eagles rou-

1981
Hunt + Johnson

Impacts

Dams

BE

Hunt et al (1980) established that the building of a dam at Copper Creek would inundate habitat that supported about 40 bald eagles in the late winter of 1979-80. Moreover, since salmon spawning in the PIA would no longer drift below Copper Creek, there would be less food for eagles downstream (see 3.3, this report). Therefore, an important question is whether

1981
Hunt & Johnson

Impacts

Dams

BE

Glock et al concluded that dam construction "... would significantly reduce the number of fish drifting downstream past the dam." It is unknown to what extent the drifting salmon became available as eagle food or how the flood may have affected the rate of carcass drift and the degree of accessibility to eagles.

Hunt & Johnson 1981

Impacts

Dams

6467
BE

From the analysis of data from the first year of study (Hunt et al 1980) we concluded that the greatest impacts of a Copper Creek Dam on bald eagles would be associated with reductions in food supply. Food loss would center around the sealing off and inundation of approximately ten miles of salmon spawning habitat.

A portion of this complement of spawning fish becomes available to eagles within the PIA while another portion drifts downstream to feed eagles below Copper Creek. Therefore, to accurately assess the effects of the loss of these fish it is insufficient to only consider the numbers of eagles using the PIA. An account must also be taken of the numbers of salmon that spawn in the PIA and subsequently become available to eagles downstream.

Hunt + Johnson

1981

Impacts

Dams

6467
BE

Our projections of the numbers of eagles displaced by a Copper Creek Dam (see 3.1.2 for methods, also Hunt et al 1980) were much lower for winter 1980-81 than for the previous year, for which we estimated that about 40 eagles would be forced into other areas. Table 3a compares the projections for the two years. In both years we noted an increase of eagles in the PIA during late winter with a concurrent loss in downstream portions of the SRSA.

1981
Hunt + Johnson

Impacts

Dams

6467

BE

OBJECTIVE 1. Determine if eagles displaced by a Copper Creek Dam would be comfortably absorbed by habitat between Bacon Creek and Rockport.

Hunt et al (1980) found that about 40 bald eagles utilized the PIA during winter 1979-80. Since little or no eagle habitat would exist above Copper Creek after a dam was built the fate of the displaced eagles is in question. The focus of this objective is to measure bald eagle carrying capacity in the SRSA and determine whether or not wintering populations of eagles are at saturation levels.

Hunt + Johnson 1981

Impacts

Dams

6467

BE

Hunt et al believed that in years of good chum salmon availability that increased human activity associated with dam construction and operation would probably not greatly influence the overall distribution of eagles in the SRSA; and that increased recreational traffic to and from the resulting reservoir would probably not significantly alter bald eagle numbers or distribution in the SRSA. However, they believed that in years of poor food availability human disturbance causing eagles to flush from feeding bars might affect the welfare of eagles, particularly those in the younger age classes.

Hunt + Johnson 1981

Impacts

Dams

6467

BE

Eagles that would be adversely affected by a Copper Creek Dam fall into at least two categories: (1) those displaced by inundation of habitat, and (2) those deprived by loss of salmon that would have spawned above the damsite and become available as eagle food downstream. If an overabundance of food can be shown to exist every year then dam impacts are minimal. In that case, displaced eagles might simply move downstream if salmon drift loss was insufficient to reduce downstream food supplies to critical levels. If, however, eagle numbers on the Skagit are food-limited, then dam-caused displacement and deprivation are of consequence since eagles must then leave the Skagit to survive. This is true even if eagles are food-limited only in occasional years if displacement involves increased mortal risk or reduced fat stores for breeding in this long-lived and slowly reproducing species.

1981
Hunt & Johnson

Impacts

Dams

6467

BE

OBJECTIVE 3. Obtain further data on eagle movements to evaluate the impact of their displacement by a Copper Creek Dam.

The 1979-80 winter study showed that 17 bald eagles radio-tagged on the Skagit and Nooksack Rivers traveled widely within the river systems and/or to various other locations in the Northwest region presumably in search of food. This information, augmented by a second year of work, provides the initial basis for an identification and evaluation of the potential of regional habitats to absorb eagles displaced by a dam.

Hunt & Johnson 1981

Mgmt. Recomm.

Dams

6467

BE

Recommendations for reducing the impacts of a Copper Creek Dam on bald eagles are given in Hunt et al (1980, 9.2, p. 88). Chum salmon availability is recognized as the primary factor generating eagle numbers in winter on the Skagit. Mitigation measures should ensure copious and widespread natural spawns through optimization of flow conditions, spawning habitat management, run enhancement, effective regulation of harvest, and basic research (see Figures 3d and 3e, this report). Since coho salmon spawning in the County Line Ponds-Whistling Hole complex provide an important food buffer in some years, a comparable coho spawning site with emphasis on carcass accessibility and flood resistance should be constructed below the dam. There is no assurance, however, that the unusual

1981

Hunt + Johnson (over)

6467

conditions, particularly of county line ponds, can be duplicated at a downstream location.

Hunt and Johnson 1981

Impacts

Dams

646

BE

The study found that over 50 class A deciduous perch trees or stands of Class A trees and over 20 gravel bars would be lost to inundation. The latter accumulate chum salmon and provide principal feeding places for eagles. The County Line Ponds-Whistling Hole complex is a major spawning area for coho and chum salmon and its loss to inundation would have a significant adverse impact on the occurrence of bald eagles on the Skagit River in some years.

Hunt + Johnson

Impacts

Dams

647

BE

The ink had scarcely dried on the deeds when the preserve faced its first serious threat.

In its search for new, non-polluting energy sources, Seattle City Light, the city's municipally owned utility, turned to the Skagit River where it already had several hydro-electric projects upstream from the refuge. Previous dams, built decades before, were constructed above salmon spawning grounds and so had little adverse impact on bald eagles. But the proposed dam, to be constructed at the confluence of the Skagit and Copper Creek, differed from the other projects because it would eliminate 11 percent of the Skagit's chum salmon and even greater percentages of other salmon species that also spawned upstream.

The trustees of The Nature Conservancy's Washington Chapter expressed concern about the proposal for two reasons. First, it was unclear if

salmon carcasses from upstream spawners constituted a significant potential food source for eagles feeding downstream. If they did, the Copper Creek dam could affect the eagles' food supply. Second, little information existed as to how many eagles the proposed dam area accommodated during the winter and where the birds would go if displaced. City Light and the Seattle City Council responded positively to these concerns and provided approximately \$400,000 for a two-year eagle impact study—probably the best funded short-term bald eagle research project ever undertaken.

Krause 1981

Impacts

Dams

6471
BE

At the end of the study's second year, the researchers stated that during the 1980-81 winter the Skagit was supporting the maximum possible eagle population. Consequently, eagles displaced under such conditions would not be able to find suitable habitat elsewhere on the river. Researchers further speculated that adult birds "would not die as a result of being forced from the Skagit, but in some years they may be unable to amass sufficient resources for breeding." Weighing all factors—which included the impact on American Indian commercial fishing of the Skagit and seismological considerations, as well as the dam's potential effect on the eagles—the Seattle City Council, in spring 1981, voted overwhelmingly to shelve the project.

Krause 1981

Impacts

Dams

6484
BE

Destruction of riparian habitat through dam building and land clearing has extremely detrimental effects on the nesting and feeding areas of this subspecies. Human disturbances within these areas have caused an additional decline in the population. Hopefully these detrimental activities can be eliminated through habitat preservation with proper management and public education.

Rubink & Podborney 1976

Impacts

Dams

6484
BE

C. Nest Site Location

Most of the bald eagle nests in Arizona are found along rivers. There are no known eagle nests on any of the reservoirs in the State. Only nest #5 was located away from a river. This nest was in a dead juniper tree next to a stock tank on the Ft. Apache Indian Reservation.)

Rubink & Podborney 1976

Impacts

Dams

6484
BE

Young-

of-the-year fish are most susceptible to being drawn through the turbines, and young-of-the-year white bass and gizzard shad comprised an important part of the eagles' diet.

Enhancement and maintenance of white bass and gizzard shad reproduction in Lake Francis Case should be a major goal of eagle management.

Steenhof 1976

Impacts

Dams

6491
BE

First, the tailwater fishery is an important food source for eagles, and it should be maintained in a healthy state. Goldeye and walleye populations are apparently the most important tailwater species for eagles. The proposed re-regulation dam would have damaging effects on the tailwater fishery, and it should not be constructed.

Steenhof 1976

Impacts

Dams

6491
BE

In November 1974 eagles fed on fish that had been trapped in pools of receding water at sandbars. These daily river level fluctuations were caused by variations in discharge from the dam. During this period up to 40 eagles congregated on the large sandbars near the roosting area shortly after sunrise. This situation occurred only in November.]

Steenhof 1976

Impacts

Dams

6498

BE

The impoundment produced by the dam enlarges the biomass of fish in the area (except where a dam interrupts an anadromous fish run).

Stumpf and Creighton 1977

Impacts

Dams

6498

BE

The tailrace below the dam tends to stay ice free giving the eagles access to fish.

The passage of water through the turbines tends to produce a steady supply of dead, injured, or disoriented fish which are vulnerable to the eagles.

Stumpf and Creighton 1977

Impacts

Dams

6498

BE

The literature contains many examples of the beneficial effects of dams and hydroelectric plants on bald eagles (Pellet, 1927; Musselman, 1945; Southern, 1963; Fawks, 1964; Ingram, 1965; Grewe, 1966; Spofford, 1964; Dunstan, 1970; and Lish, 1975).

Spencer (1976), devotes a chapter to the subject of dams and hydroelectric plants. In general, several factors caused by dams benefit eagles.

Stumpf and Creighton 1977

Impacts

Dams

6498

BE

It seems likely, however, that the impoundments simply offer a larger prey base and that the eagles make adjustments for lower quality in other habitat components in order to take advantage of the prey base.

Stumpf and Creighton 1977

Impacts

Dams

6498

BE

DAMS The literature is uniform and voluminous on the subject of the beneficial effects of dam construction upon bald eagles. While there is no question that some dams have caused some nesting pairs of bald eagles to relocate, the overall effect is to increase the aquatic habitat which in turn increases the biomass of fish. This often results in an expanded prey base for bald eagles.

Stumpf and Creighton 1977