WATER SOURCE INVENTORY

Importance of Field Inventories

- The goal of a water source inventory is to generate solid information that can stand up to scrutiny by the state water agency and state courts - YOU could be put on the witness stand.

- A viable water right depends on verified/quantified uses, measured flows, accurate locations and detailed descriptions of the water development - without this information, a water right can be a worthless piece of paper!

- Water rights filed previously may need to be re-verified, as many of them were filed before GPS, uses may have changed since water rights were filed and conditions of developments may have changed.

- Often, water inventory is completed by use of seasonal or temporary help. However, when assigning this work, a manager should be aware that:
    - Field inventory work requires specialized training; and
    - Department of Justice would prefer that inventory work is done by a person likely to be available as a future witness and who has technical experience.

- Water source inventories are frequently used for other resource management purposes, such as in riparian inventories, plant inventories, groundwater characterizations, etc.

Organization and Preparation

- Establish priorities among the hundreds of water sources in the field. Base decisions on the greatest threat from competing users, sources that Federal programs rely most heavily upon, sources that produce reliable flow, pending land tenure adjustments, etc. For efficiency, concentrate on one geographic area at a time.

- Identify water sources using information gathered from within and outside the Agency (see notebook reference "**Sources of Information for Locating Water Sources**").

- Contact the Alaska Department of Natural Resources (DNR) periodically to ensure there are no new types of data required for completion of the water rights forms or environmental documents. This will save time in having to revisit the source later or find out the source is within a basin closed to further appropriations!

- Research background information on each source:
    - Is the source developed? If so, who developed it and is it an authorized development? Obtain a copy of the project completion report, ROW/SUP grant.
    - What is the planned/actual/potential use of the project?
    - Is the source within a special designated land or water management area by the Agency (e.g., special wildlife area, grazing allotment, special recreation management area, Area of Critical & Environmental Concern (BLM), wilderness area, national monument, national park/refuge, etc.)?
    - Is the source within a special designated area by the State (e.g., watershed closed to further surface water or groundwater appropriations, critical groundwater basin, etc.)?

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- Compile the appropriate topographic maps, aerial photographs, information documents and land status. Check *Google Earth* website – often, ponds and other structures can be seen on updated photos. Make sure you have permission to cross private lands.

- Develop an itinerary - plot the sources on a topographic map, plan out a route and check access problems such as locked gates and washed out roads/bridges.

- Recheck your equipment pack - make sure all meters have been calibrated and are in good working order, that you have packed extra inventory forms, batteries, don't forget the cell/Sat phone, etc.

- Make sure to secure your authorized means of transportation (via boat, helicopter, fixed-wing, etc.).

- Make efficient use of field time; coordinate with other specialists to go together to an area.

Field Techniques

A few pointers to reliable, efficient inventory efforts that will withstand legal scrutiny:

- Safety First! Every time you go to the field, be aware of your surroundings and know the hazards you may face on the job.

- Take a few moments at the beginning to get the BIG PICTURE! Walk around the entire site before beginning your inventory. Often, standing on high ground doesn't always give you the big picture as infrastructures can be hidden by vegetation and control boxes cannot be seen from a distance. Look at the function and condition of the source before taking measurements or drawing conclusions. Overall questions that should be answered:
    - How DOES this structure or source currently function?
    - How SHOULD this structure function?
    - What is the condition of the structure/source?
    - Are any improvements needed here?
    - What is happening in this watershed that may affect the source?
    - As I am looking around, is there any indication that there is more to the development than what is at the source area (i.e., buried pipelines, troughs)?

- Establish a routine - if possible, go through the process in the same order every time (i.e., take photos first, water quality measurements second, etc.). This ensures that nothing gets forgotten!

- Focus on getting information that can ONLY be obtained in the field - vegetation types, wildlife species, documentation and evidence of other beneficial uses, water source condition, photos, water quality and quantity, verification of location, etc.

- Identify and document the beneficial uses. This is one of the most crucial pieces of field information to be obtained. Remember that a water right is a "right of use" and, thus, tied to a specific beneficial use.

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- Document all information needed for the water right application and Statement of Beneficial Use forms – especially measure all aspects of the development (including all containment and conveyance systems) and water quality and quantity.

- Photo documentation:
  - Be generous with photos; they help in court, assist your successors in finding the source again or verifying that they are indeed at the "right place", and facilitate discussion of the source back in the office.
  - Take photos of everything - the source area, the diversion works and each place of use, evidence of beneficial use and, if possible, an overview photo of the entire area.
  - Label each photo taken: source name, date photo taken and location information (legal description & GPS). For pond photos, label views upstream, downstream, spillway, dam and high water marks (as evidenced by vegetation around pond area). If photographs are used in court, most likely they will require an affidavit stating they have not been altered or otherwise digitally manipulated.

<u>Location Confirmation</u>

- Correct Locations:
  - Correct legal descriptions are critical because the entire water right is based on the location of the water - you may have a water right on dry ground if you're not careful.
  - It is important to plot the location on the topographic map while in the field, not in the office, even if you carry a GPS unit. There are times when dead batteries, poor satellite configuration or a damaged GPS unit do not allow for accurate readings! Also recommended is that recent aerial photographs or orthophoto quads be used, showing townships, ranges, sections and Agency boundaries.
  - Make sure to note the locations of all use points - this is especially important with long pipeline systems!
  - Note the first **named** drainage in the watershed in which the source is located - often, a source is found in (or tributary to) an "unnamed" drainage.
  - Topographic maps can be inaccurate - note the date on the map and note changes in roads, buildings, stream channels, etc.
  - Don't forget to check the Master Title Plats when you return to the office - check to see if the source location or use points are within a section with lots or tracts. If the source is within a lot, remember that the correct legal description is the lot number!

- Process for establishing your location:
  - Locate the drainage pattern you're in.
  - Verify location along the drainage by matching significant topographic features on the map with ones you see.
  - Verify exact location by using a compass, pacing, tape and/or vehicle odometer to establish distance and bearing from known points (roads, section corners, stream confluences, etc.).
  - Plot this distance and bearing on the map using land area and slope indicator.
  - Use GPS! In Alaska, DNR requires identifying locations by lat/long. However, federal agencies often locate sources with UTMs. Always reference the system and datum used; it can always be converted to something else later!

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The Inventory Form and Database

- Field Inventory Forms
  - Should provide a standard data format that allows for consistency, quality, and ease of computer entry.
  - Are different from state to state due to different water laws and permitting requirements.
  - Have many common data elements from state to state (source name, legal description, tributaries, beneficial uses, quality and quantity measurements, description of projects, measurements of system capacities, etc.).

- Existing Agency field inventory data:
  - BLM: BLM in Alaska has no statewide water inventory program. Water data is kept at the individual Field Offices and is conducted mainly ad-hoc in response to a specific issue or as part of a planning effort.

  - USFS: The Chugach and Tongass NFs have no active inventory program for point sources (such as springs or ponds) and no inventory forms. Lake data is stored in a GIS database or in the National Wetlands Inventory. There is no active inventory or form for instream flows, although some streamflow data (as part of FERC or an occupancy permit) are stored in excel spreadsheets.

  - FWS: For gaging and lake monitoring, FWS uses USGS formats. At present, they do not manage wells.

  - NPS: The NPS in Alaska has few flow monitoring sites which are generally done by one of four inventory and monitoring networks: the Southeast Network (SEAN) references the USGS Manual; the Arctic Network (ARCN) does not do any flow monitoring but has plans to begin monitoring of lake communities; the Central Network (CAKN) does some flow monitoring but does not appear to use a specific form; and the Southwest Network (SWAN) has developed its own guidelines and protocols (*see NPS references in "Field Inventory & Monitoring Forms" section*).

  - A draft field form has been developed for this course, patterned after a BLM Arizona and New Mexico field form with modifications for Alaska. It can be used to document all "point" source types – wells, ponds, diversions from creeks and springs (see notebook reference, **Alaska Field Water Uses & Needs Inventory Form).**

- The purpose of an ongoing inventory is to:
  - Document water sources for which reserved rights may be asserted (such as for wilderness, national monuments, parks, refuges, NCAs, etc).
  - Document sources that need to filed on or were previously "missed".
  - Document sources acquired and disposed of in land exchanges or acquisitions.
  - Note changes in vegetation conditions, flows and animal usage over time for riparian and wildlife management purposes.

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- Water Source/Use/Rights Database: An effective water rights program must have an efficient method to record and store inventory data and up-to-date computer databases allow you to meet the following needs:
  - Generate reports quickly to meet requests from the state water agency, the BLM State Office, USFS, NPS and FWS Regional Offices and the Washington Office.
  - Access to information required in connection with state administrative adjudication proceedings.
  - Important tool for use in the planning process (example: can provide a list of all sources in a planning area, allotment, etc. to allow identification of water quality and quantity problems).
  - Quickly check to see if private party applications affect Federal rights.

- Agency water rights databases:
  - BLM: BLM in Alaska has no statewide water rights database. Records are kept in each of the Field Offices as hard copies in file drawers, in the Aquarius hydrology database or on excel spreadsheets.

  - USFS: R10 uses the new NRIS system called WRU (Water Rights & Uses). In addition to NRIS, there is also water use and infrastructure data stored in INFRA (range and engineering data), which is a work in progress for the Tongass NF and not used by the Chugach NF. Developed spring data is stored in INFRA if it is a drinking water source. There is no form or database to store data for Temporary Water Use Authorizations on FS lands, only correspondence with DNR.

  - NPS: All four of the NPS's inventory & monitoring networks in Alaska rely on USGS's hydrographic database and do not maintain their own inventory.

  - FWS: Streamflow and stream temperature data are maintained in WISKI (Water Information System Kisters) database via a server in Denver that is shared by other regional offices. Instream flow and water right applications are maintained in-house in paper and digital forms and through DNR's Land Administrative System (LAS).