	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	1	Last Reviewed/Update Date	10/13/2016
		Approval	

Mineral Prospecting

The purpose of this document is to provide guidance and assistance when reviewing pre-application requests and [hydraulic project applications](#) for mineral prospecting activities not covered by the most current edition of the WDFW [Gold and Fish Pamphlet](#). Typically this includes small-scale mineral prospecting outside of the Gold and Fish Pamphlet allowed equipment and/or Authorized Work Times. The impacts of small-scale mineral prospecting can be minimized primarily through operational restrictions, including the type of mining equipment, limitations on excavation zones and spoil discharges near streams, and allowable work windows (North 1993). The guidance applies to streams where fish life may be impacted by mineral prospecting and provides the biologist with basic information to process an application.

Table of Contents

1.	Application Receipt.....	1
2.	Office Review.....	1
3.	Missing Information	4
4.	Site Visit	4
5.	Mitigation Determination	10
6.	Rules of Thumb	10
7.	Relevant WACS.....	11
8.	Examples of Documentation of Approved Locations	12
9.	References.....	12


1. Application Receipt

Applications or pre-applications are submitted to [Aquatic Protection Permitting System](#) (APPS). The application and plans are reviewed in Olympia for statutory completeness under [RCW77.55.021](#). Once the application is Accepted, the Habitat Biologist reviews and processes the application within APPS. There are training [videos](#) and [self-help](#) documents for this process located on SharePoint.

2. Office Review

Purpose

The office review allows the biologist to become familiar with the project details, location, and determine if the project was designed to meet WAC. The biologist must be knowledgeable of [Chapter 77.55 RCW](#), [RCW 77.55.091](#), [Chapter 220-660](#)

 Washington Department of FISH and WILDLIFE	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	2	Last Reviewed/Update Date	10/13/2016
		Approval	

[WAC](#) and [WAC 220-660-300](#) since the agency's authority is derived from the RCW and WAC. The biologist must also be familiar with the most current edition of the WDFW [Gold and Fish Pamphlet](#) since the pamphlet provides the necessary provisions to meet all WAC 220-660-300 requirements. During the review the biologist may consult reference materials, agency data and supervisor or coworkers (including Fish Program, other resource agencies, tribes regarding fish life present) as necessary to determine if the application and the project are appropriately designed to protect fish life or if additional information is needed. Presence of fish life, including the species present, strongly influences proper project design. The biologist should be familiar with all types of mineral prospecting equipment and activities that are and are not covered by the current edition of the Gold and Fish Pamphlet.

The biologist first reviews the project location description, equipment, and project timing. Work outside of the authorized work times, in broad areas where spawning and incubation occur, cannot be permitted because it does not protect fish life. Specific and identifiable locations in streams with spawning and incubation may be permitted outside the authorized work times, provided fish life can be protected. Note that some streams in the Gold and Fish Pamphlet do not have identifiable work windows and are labelled as "Submit Application". Most of the stream support spawning and incubation year-round as the timing of emergence of spring spawning fish overlaps the onset of fall spawning fish. Thus, opportunity to issue Hydraulic Project Approvals in these streams is more limited.


Consider potential impacts to spawning and incubation for the locations in the application if the activity is outside the Gold and Fish Pamphlet Authorized Work Times. Four important considerations are: 1) what fish species are present, 2) when is the spawning, incubation and emergence timing, 3) specific location(s) of spawning habitat and 4) other fish habitat types such as adult holding pools or juvenile rearing habitat that may be affected by the proposed hydraulic project.

Information on fish species use, spawning and incubation timing, and location of spawning habitat can be found in existing WDFW, Ecology, DNR, USFWS, Tribal or Forest Service redd and pit tag array information on GIS or other data sources (such as WDFW's [Priority Habitats and Species \(PHS\) on the Web](#), [PTAGIS \(PIT Tag Information System\)](#), Forest Service Reports, USFWS Reports).

If there is any question as to where spawning may occur, the biologist will need to visit the site and document specific locations of spawning habitat relative to the project proposal. Such sites must be avoided or will require protection if work is proposed within the wetted perimeter and outside the authorized work times.


Tools and Resources

Data for reviewing hydraulic projects comes from a variety of sources such as government agencies (local County GIS), Non-Governmental Organizations (Wild Fish Conservancy Maps) as well as private sources of information. Most of this data is available either through WDFW's GIS database or through various internet websites.

 Washington Department of FISH and WILDLIFE	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	3	Last Reviewed/Update Date	10/13/2016
		Approval	

Other data may be in the form of hardcopy records acquired over time or from coworkers in the agency. Fish Program District biologists may have individual stream files with information on fish life presence. All of this information is valuable but ultimately a field visit may be necessary to verify the information. Below is a list of commonly used resources:

- WDFW Publications – [Aquatic Habitat Guidelines](#), [Priority Habitats and Species \(PHS\) on the Web](#), [Salmonscape](#), [Salmonid Stock Inventory \(SaSI\)](#), most current edition WDFW [Gold and Fish Pamphlet](#), and WDFW [Small-Scale Mineral Prospecting White Paper](#).
- WDFW Fish Program – Spawning survey data, redd counts, district fish biologist expertise, and data from [PTAGIS \(PIT Tag Information System\)](#).
- Local, state, and federal government agencies or tribes that also regulate in or near water activities.
- ArcView - WDFW possesses various GIS data sets that include DNR water typing, fish passage barrier inventories, culvert inventories, fish distribution, LIDAR topography, etc. WDFW has created an ArcView project file that allows a biologist to view most if not all of our GIS data. If you are not set up to use this system, work with your supervisor to do so.
- [Department of Ecology](#) - maintains a variety of data including:
 - [The Water Quality Assessment and Clean Water Act 303\(d\) list](#)
 - [Coastal Atlas](#) - detailed shoreline imagery.
- [Department of Natural Resources](#) - There are many data layers on the DNR website that you can download and use on GIS. These include fish passage barriers, water typing layers, forest roads, soil types, and many more.
- County Parcel information - Most if not all counties in the state maintain a GIS database of parcel information in their county. This data may also be available through our existing agency GIS data, but is not updated regularly. Some counties do not release their information. It is best to find the ones that do for your area and upload them into your GIS. Others you will need to locate and create an Internet bookmark for yourself to access.
- [Google Maps](#) - for site context, local characteristics, neighboring properties, potential equipment access, estimation of Ordinary High Water Line (OHWL), upland vegetation, and vicinity of project to waterbody, relative steepness of the bank, and apparent erosion.
- [U.S. Forest Service Stream Systems Technology Center](#) – Resource for tools and science applications including software, educational materials, and videos.

	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	4	Last Reviewed/Update Date	10/13/2016
		Approval	

3. Missing Information

Biologists may request more information before issuing a permit in order to effectively evaluate the project and issue an appropriate permit. New information and feedback to the applicant should happen as soon as possible giving the applicant a reasonable amount of time to reply. Any needed additional information should be requested within 10 days after receiving the complete application. If information needed to issue a permit is not provided, the agency may deny the application or the applicant may put it on hold before the end of the 45-day processing period. If these situations occur you should be working closely with your supervisor to avoid conflicts.

Biologists should contact the applicant if the pre-application or accepted application requests a timing or equipment change for a whole or lengthy section of the stream(s). The biologist can ask the applicant to modify the application to limit the size of the requested area so that a site visit may be completed to evaluate the possibility of granting limited entry. It is not feasible or expected for the biologist to review a whole stream, or long stream reaches, for possible exceptions to the Gold and Fish pamphlet. An exception would be the instances where there are likely or known to be, multiple applicants within a specific claim or stream reach. Biologists should work with the applicant early in the process to persuade them to modify the application instead of the application being denied.


4. Site Visit

Purpose

For any type of HPA, site visit reviews typically occur as a pre-application review or the review of an active application in APPS. It is preferable that the biologist speak with the applicant during a pre-application consultation to help them identify the site conditions and stream channel characteristics they should be seeking in which to perform mineral prospecting work outside the work window. More complete hydraulic project applications with specific project locations will improve efficiency in processing Hydraulic Project Approvals.

Site visits are necessary to ensure that WDFW has collected the data needed to defend permit decisions. As shown in the January 15, 2015 Beatty v. WDFW Commission Decision (Case 314090), requests to work outside the authorized work times may be denied if the applicant fails to provide site-specific information that allows WDFW to adequately assess impacts to fish life. During a site visit, the objective of the biologist is to specifically delineate easily identified boundaries and limits for authorized work outside of the standard work window, as well as equipment, operation, or excavation requirements not covered in the current edition of the Gold and Fish Pamphlet.

The biologist will identify the different types of habitat used by the fish species at the location requested to work and prepare clear descriptions of this habitat (photographs are encouraged). Gather all data regarding spawning and incubation, adult holding pools, and juvenile rearing habitat, for example, for the species of fish that are present during the time of the proposed work. If spawning survey or any

 Washington Department of FISH and WILDLIFE	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	5	Last Reviewed/Update Date	10/13/2016
		Approval	


other additional fish habitat data are available, prepare a map in advance in ArcGIS. Pictures edited with identified boundaries and limits of any approved work may also be uploaded. If you are only given a township, range and section, map those areas, then add in the existing data. The map can be converted to a PDF file and loaded to the iPad or smartphone using a free app called "[Avenza](#)." Upload any pdf map files produced to the documents section for the application in APPS. The Avenza app will work in the field without cell service if the map was previously loaded. It will display your exact location referenced on the map. If you load the redd location/spawning habitat data to this map, you can show the applicant the proximity of your current position to documented spawning habitat in the field. Additionally, if PIT Tag Array, smolt trapping, or fish life inventory data is available, include a summary of this information and upload it into the documents section of the application in APPS.

It is not required that the applicant attend the site visit. However, it is helpful to have the applicant present to help ensure a clear understanding of expectations, work limits, and to obtain additional information on the location of the proposed project. If the applicant is unavailable or unable to arrange a site visit within 10 days of receipt of an application, WDFW should put the application on hold until a site visit can be scheduled. If the site is physically inaccessible due to snow or high water, WDFW may put the application on hold until the site is accessible ([WAC 220-660-050 \(13\)](#)).

The biologist should explain to the applicant what they are looking for at the site, such as locations that could support mineral prospecting and not negatively impact fish habitat (typically bedrock, boulders and heavy cobble where spawning and incubation is unlikely and no "pocket spawning exists"). The biologist should also show the applicant how the information will be used to delineate and map the allowed work areas. Allowed work areas should be clearly marked in the field using readily identifiable, permanent physical landmarks. If physical landmarks aren't available to describe metes and bounds (bridges, creek mouths, culverts etc.), the biologist should include GPS coordinates and photos with mark-ups of the allowed in-water work areas' upstream and downstream limits.

Always explain to the applicant the rationale for allowing or denying mineral prospecting in certain reaches of the stream in terms of protection of fish life and fish habitat. While limitations are most often necessary to protect spawning and incubation habitat, protection of other critical habitat or life history stages of fish life may be involved. Allowable exceptions to the stated provisions in the Gold and Fish pamphlet may include: allowing work within areas that are outside the wetted perimeter when there is sufficient area and distance to treat excavation spoils and sediment laden wastewater prior to entering the stream, or wetted areas of bedrock or identified stream reaches where spawning and incubation, or other critical habitat or fish life will not be adversely impacted.

For specific requests to suction dredge outside the authorized work time, dredging may not occur within 200 feet upstream of any spawning and incubation habitat. The 200 foot distance is based on the distance required for the influence of small-scale mineral prospecting generated turbidity and dissolved concentrations of metals (such as dissolved concentrations of copper, lead, zinc and total arsenic) to return to

	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	6	Last Reviewed/Update Date	10/13/2016
		Approval	

ambient levels (Ecology 2005). Greater buffer distances from spawning and incubation areas may be necessary where heavy sediment loads are present as sediment can be delivered downstream to spawning and incubation areas. This can be an important consideration in smaller streams where minimal dilution of mobilized sediment occurs.

If there is a pre-application site visit, let the applicant know what information is needed for a complete application so that you can conduct an efficient site review and expedite permit processing. After a pre-application review, in most cases, another field visit is not necessary, unless the requested work area is such a large stream reach that to survey for spawning habitat would require more than one standard work day to survey.


If there are likely to be multiple applicants for a specific claim within a stream or reach, there is benefit to surveying the habitat and/or areas where certain types of mineral prospecting may be permitted within an entire claim. Mapping the entire claim can preclude the need for repeated site visits and is therefore prudent, as significant time savings in site reviews is realized. This approach also helps provide consistency between Hydraulic Project Approvals within the same stream for similar hydraulic projects. While surveying a claim or reach may take a few days to complete, the biologist then has the collected information available for future applications, if the application matches a previous request (location, equipment and timing).

The biologist should always give the applicant the option to meet on site and explain the approved work locations, even if these locations were previously surveyed for an earlier application. The applicant may decide they do not wish to meet for a site visit and prefer the permit be issued based on the information collected at an earlier date. All previously collected information (maps, photos, GPS locations, etc.) will be uploaded to APPS for each individual application for these same location(s).

When processing either a pre-application or complete application, the purpose of the site review is to gather site-specific information necessary to assess proposed hydraulic project impacts to fish life and habitat. If the biologist finds that the proposed project will not provide for the proper protection of fish life, they provide suggestions to the applicant to modify their application. For example, if suction dredging is not appropriate at the requested location, suggesting an alternative location or equipment type such as a high-banker, may be an alternative the applicant may wish to consider.

Safety Highlights

Field reviews of applications for mineral prospecting frequently occur in forested, remote locations and staff must use caution when working in this environment. Vehicles must be parked in a safe place. When possible, coordinate the field review with another WDFW staff member, such as a district fish biologist, enforcement officer, or other habitat biologist, rather than work alone. Make sure a coworker or


 Washington Department of FISH and WILDLIFE	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	7	Last Reviewed/Update Date	10/13/2016
		Approval	

supervisor knows the location of the field review (e.g. use calendar appointment to include directions to location and expected time of review). Field visits during high flows or floods should be avoided because it may be unsafe to walk the streams or rivers and it may not be possible to observe spawning or other critical types of fish habitat. If the site is physically inaccessible due to snow or high water, the habitat biologist should put the application on hold until the site is accessible. There are many mandatory training and safety aspects to field work. Make sure you have worked through your supervisor in conducting such trainings and reviewing agency policies before conducting field work.

Field Equipment and Tools

In addition to the basic safety equipment, staff should also bring the tools and equipment listed below. Conditions on site will dictate which equipment is used during the field visit. Staff should enter a calendar event on their calendars indicating the time and location of the site visit. Staff should also follow a check-in/check-out procedure if going to a remote site.

- Portable Radio (if available)
- Copy of application and plans
- Map of proposed work area (upload copy to GPS and iPad/smartphone in advance)
- Camera and spare batteries
- iPad or smartphone (fully charged)
- GPS and spare batteries
- Tape measure (minimum 100 feet – to measure 200 feet upstream between spawning habitat and next allowed upstream work area (see page 6), or to document distances from landmarks)
- Field notebook
- Polarized sunglasses
- Knee or Hip boots or Chest Waders or Wading Boots
- Personal Floatation Device (PFD)
- Rain gear

	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	8	Last Reviewed/Update Date	10/13/2016
		Approval	

Verifying Application Information on Site


Once on site, the biologist should ask the applicant (if present) what kind of equipment they plan to use, where their activities will take place, whether it be the entire mining claim or select locations. This initial conversation may yield useful information; the applicant may only wish to mineral prospect in select areas so the focus would be on these site specific locations rather than the entire proposed location. This can also be done via phone or email prior to the site visit if the applicant does not attend the site visit.

The biologist should walk the stream with the applicant, if available. Start from the downstream end of the requested location and measure spawning habitat and record this information in your notes. Take GPS points, photos, and measurements in presence of the applicant, or ask the applicant to assist. You can explain how spawning habitat is identified, for which species, and if the applicant is proposing to suction dredge, the 200 feet buffer measured from downstream spawning habitat to the upstream start of the next allowable work site. While walking the stream, the biologist should also note streambed material, sediment size, regrade potential, and riparian conditions. Other site characteristics that might influence the project and habitat impacts should also be recorded. For example, if the applicant plans to highbank, spawning habitat may not be affected but the biologist must make sure they are using a compliant fish screen on the water pump. Also, the biologist should determine whether there is a practical means and location to effectively treat wastewater and excavated or dredged spoils on-site to avoid discharge to waters of the state. The biologist should also explain that removal of riparian vegetation is not authorized. Document the site inspection with photos and enter all information in APPS site inspection log and/or the project file in the documents section.

Based on fish life histories present, spawning, other habitat data, and measurements, proposed plans, type and operation of equipment proposed, and project location, the biologist must determine if the proposed activities satisfy the minimum requirements to protect fish life per [WAC 220-660](#). If the proposed activity is not adequately protective of fish, the biologist should suggest possible alternatives that could meet the requirements, or the HPA will have to be denied.

The minimum information that should be recorded in field notes to create a map of allowed work areas will be:

- APP ID or applicant name if no pre-application or application submitted
- Stream name
- Directions to site
- Latitude and longitude coordinates, photos, and/or landmark descriptions and distances for the upstream and downstream claim boundaries or approved work area
- Latitude and longitude coordinates, photos, and/or landmark descriptions and distances for the individual allowed work area upstream and downstream limits/boundaries within the claim or approved work area

	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	9	Last Reviewed/Update Date	10/13/2016
		Approval	

- 200 foot separation from downstream spawning habitat to next allowed upstream work area
- Note fish habitat – especially spawning, but include rearing, holding areas, etc.
- Note riparian habitat – no riparian areas or vegetation shall be removed as part of these projects
- Note fish observations – species and number
- Date and time
- Individuals present (e.g. WDFW Habitat Biologist, WDFW District Fish Biologist, Applicant, etc.)


Identify Project Impacts

Impacts to fish life vary based on site specific conditions and how and when the project will be conducted. During the site review, the biologist should keep in mind the potential impacts and document those impacts to fish and fish habitat that may occur from the project. Negative impacts to fish life and fish habitat by mineral prospecting activities must be avoided. Determine whether limiting the number of pieces of equipment is necessary to avoid impacts, and be sure to include language regarding any limits in the HPA.

Requests for equipment not listed in the current edition of the Gold and Fish pamphlet or sized greater than what is allowed by the current edition of the Gold and Fish pamphlet must also be evaluated for impacts to fish habitat and fish life. Based on the site-specific location and the life history of the fish species present, the biologist must evaluate if the proposed equipment will have an impact on fish life. Primarily, determine whether the equipment will cause significantly greater damage to the bed or banks. If the biologist is unfamiliar with a new type of equipment, request additional information needed to evaluate any impacts from the applicant and consult with supervisor or coworkers.

It is important that the biologist clearly understands the type of mineral prospecting equipment that is proposed, how it operates, and how excavation of material will occur in order to be able to assess the potential impacts to fish life. Important questions to ask or consider regarding proposed work includes:

- Where and how will material be excavated? Suction dredge, shovel?
- What type of equipment is involved? Can I see the equipment or do you have pictures? Can you explain how it works? (Especially significant if it's an unusual type of equipment, or a type the biologist is not familiar with)
- What is the processing rate of the equipment (Cubic feet or yards/hour)?
- How large of a pit will be excavated and where will it be? What is the depth? What is the width? Proximity to the wetted perimeter? Proximity to unstable banks?

 Washington Department of FISH and WILDLIFE	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	10	Last Reviewed/Update Date	10/13/2016
		Approval	

- Where will processing of materials occur? Will there be discharge of sediment laden wastewater? If so, where and how will it be treated to prevent discharge to the stream?
- Where will excavated spoils be placed? What is the risk of loss of sediment into the stream during storm events? Considering the time of year, what's the risk of a storm event? Is there sufficient area out of the wetted perimeter for practical wastewater treatment?
- Will excavation pits and spoil piles be susceptible to inundation due to flow fluctuations in the stream? Will excavation pits be filled in at the end of each day? If not, what will the applicant do to avoid discharging stockpiled sediment into the stream during weather events?
- What if fish are trapped in the excavated pit during flow fluctuations?

Establishing appropriate work window


The biologist should refer to [WAC 220-660-110](#) when determining the appropriate work window. Exceptions to standard work windows should only be issued in instances where site-specific conditions and proposed work is such that impacts to fish life can be avoided. For example, cleaning cracks or crevices in bedrock, or in areas in high gradient stream reaches with boulders or cobble substrate without pocket spawning habitat has minimal potential to impact fish life. Evaluation of fish impacts includes consideration of fish presence, life history stage, and the biologist's assessment of the potential impact of the proposed work. Mineral prospecting should not be authorized where excavation or work is proposed and where accessible spawning habitat or spawning or incubating fish life are present.

5. Mitigation Determination

Mineral prospecting activities must be self-mitigating. The department must deny a HPA if the project will result in direct or indirect harm to fish life, unless enough mitigation can be assured by provisioning the HPA or modifying the proposal ([WAC 220-660-300 \(3\)\(b\)](#)). Mitigation guidance is currently provided in [WAC 220-660-080](#) - Mitigation requirements for hydraulic projects.

6. Rules of Thumb

- The biologist should be very clear with the applicant about the next steps in the process. If the applicant is expected to provide additional information, the biologist should clarify when that information will be provided and how. For example, if a pre-application was submitted and reviewed, let the applicant know what additional information will be required in APPS (either in the application itself or as an additional document) for a complete application. For an accepted application, determine whether the applicant has submitted enough information to approve the application based on fish life and fish habitat. If more information is needed from the applicant to approve the

 Washington Department of FISH and WILDLIFE	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	11	Last Reviewed/Update Date	10/13/2016
		Approval	

application, let them know if the application should be amended or if additional documents are required.


- Once you have drafted the permit in APPS, it is okay to share a draft and supporting documents with the applicant for review, if there is time.
- New employees should go over the application and draft permit with their supervisor or experienced colleague before issuing.
- It's okay to say that you do not know the answer to a question and that you need to consult with your supervisor or district fish biologist.
- You should not feel pressured to issue a Hydraulic Project Approval for an exception to the standard work window. The work windows should prevail unless site-specific conditions and proposed work is such that protection of fish life can be provided.
- Every stream location requested is a bit different and has its own set of challenges.
- Some streams have a long history of prospecting and the spawning habitat areas are well documented. Consult with the fish survey biologists about the location and determine if the site contains known spawning areas. However, be aware that stream characteristics and conditions are dynamic due to flood events, fire, etc. Exercise caution in issuance of multi-year mineral prospecting Hydraulic Project Approvals that provide exceptions to the standard work window in locations where there are dynamic channel conditions and reasonable risk of change at the project site (i.e. what was not spawning and rearing habitat last year could become so after a flood event).
- Remember that Hydraulic Project Approvals can be withdrawn if site conditions change after a permit is issued (generally, an unusual occurrence). If this happens, consult with your supervisor to determine what action needs to be taken.
- When time and workload allow, it is strongly recommended that a post-construction compliance inspection is scheduled with the applicant and/or agent. The purpose of this inspection is to ensure the project was constructed according to the permit conditions required for the protection of fish-life. Large, complex, or high risk projects should be prioritized for inspection. Additionally, any project that implements novel, nonstandard construction techniques or structures should be inspected. This compliance inspection should be done preferably when the contractor is still on site so as to correct any issues and be recorded in APPS or other permitting databases in a timely fashion.

7. Relevant WACS

[WAC 220-660-080](#) - Mitigation requirements for hydraulic projects

[WAC 220-660-100](#) - Freshwater habitats of special concern

[WAC 220-660-110](#) - Authorized work times in freshwater areas

	Habitat Program	SOP #	6
		Revision #	
		Implementation Date	
Page #	12	Last Reviewed/Update Date	10/13/2016
		Approval	

[WAC 220-660-120](#) - Common freshwater construction provisions
[WAC 220-660-300](#) - Mineral Prospecting

8. *Examples of Documentation of Approved Locations*

Plans for mineral prospecting have their own set of challenges. Typically, the only information provided in an application is basic location information (Township, Section, Range, and Latitude and Longitude Coordinates), the type of equipment, and requested work time. Any maps submitted are typically hand drawn and not geo-referenced. Rarely are detailed plans submitted, so it is up to the biologist to provide the documentation of authorized work locations to the applicant and as part of the APPS record, as part of the issuance of the HPA.

Documentation should include the following:

- 1) Photos of upstream and downstream authorized work location limits and boundaries,
- 2) Location information: GPS'd latitude and longitude coordinates (note accuracy to account for any mapping error) and/or landmark descriptions and distances for authorized work locations,
- 3) Map detailing authorized work locations and protected habitat; additional habitat details if available, such as mapped redd locations, etc.
- 4) If necessary for clarity, written description of the boundaries to support the photos and maps

9. *References*

North, P. 1993. A review of the regulations and literature regarding the environmental impacts of suction gold dredges. U.S. Environmental Protection Agency Region 10 Alaska Operations Office.

Washington State Department of Ecology (Ecology). 2005. Effects of small-scale gold dredging on arsenic, copper, lead, and zinc concentrations in the Similkameen River. Publication No. 05-03-007. Olympia, Washington.