Scientific Measurement Devices

Programmatic Biological Evaluation
Scientific Measurement Devices
Version: October 13, 2000

1. Summary of Activity:

a. In All Fresh Waters *excluding* Columbia River mainstream: Placement of new devices or replacement of old devices (with no greater dimensions than those already in place) whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures, provided that: work is done within the approved work window, no work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or spawning habitat for listed or proposed fish species, no uncured concrete shall come into contact with the waterbody, no new piling is placed, no land leveling or grading is conducted, no fill is placed in wetlands or waterward of OHW, work does not include weirs and flumes, placement does not require the de-watering or hydraulic modification of a stream or waterbody, and work will be done during low flow and when possible in the dry. [from NWP 5 or 3]

b. In the Columbia River mainstem *including* Snake River and Baker Bay: Placement of new devices or replacement of old devices (with no greater dimensions than those already in place) whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures, provided that: work is done within the approved work window, no work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or spawning habitat for listed, proposed or forage fish species, no uncured concrete shall come into contact with the waterbody, no new piling is placed, no land leveling or grading is conducted, no fill is placed in wetlands or waterward of OHW or MHHW, work does not include weirs and flumes, placement does not require the de-watering or hydraulic modification of a stream or waterbody, and work will be done during low flow and when possible in the dry. [from NWP 5 or 3]

c. In All Marine/Estuarine Waters *excluding* Baker Bay: Placement of new devices or replacement of old devices (with no greater dimensions than those already in place) whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures, provided that: work is done within approved work window, no work is done over or adjacent to vegetated shallows or spawning habitat for forage species, no uncured concrete comes into contact with tidal waters, only one new pile or dolphin is placed, the pile or dolphin is not treated with creosote or pentachlorophenol, no land leveling or grading is conducted, no fill is placed in wetlands or waterward of MHHW, work does not include weirs and flumes, placement does not require the de-watering or

hydraulic modification of a waterbody, and work will be done during low tide and when possible in the dry. [from NWP 5 or 3]

2. Programmatic Description: Individual permits (IPs), Letters of Permission (LOPs), and/or Nationwide Permits 5 or 3 (NWP5 or NWP3) may authorize the placement of scientific measurement devices including placement of up to 25 cubic yards (cy) of fill for weirs and flumes, into waters of the U.S. This programmatic biological evaluation only covers placement (via NWP5) or replacement (via NWP3) of scientific measuring devices into waters of the U.S. that do not require placement of associated weirs or flumes. Additionally, this programmatic biological evaluation does not cover placement that requires de-watering of streams, placement of fill waterward of OHW or MHHW along with the other conditions listed above (under Summary of Activity). Work that cannot be designed or constructed to fit under this programmatic biological evaluation must go through individual informal or formal ESA consultation.

3. Project Location: In all fresh waters and all marine/estuarine waters, only in the counties of Washington State where the National Marine Fisheries Service and U.S. Fish and Wildlife Service have concurred that the project is not likely to adversely affect listed fish species and designated critical habitat and will not jeopardize proposed fish species or destroy or adversely modify proposed critical habitat.

4. Project Description: Placement of devices whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures. Activities covered within this programmatic biological evaluation must be accomplished solely for the collection of scientific information. This programmatic biological evaluation does not cover any interrelated and/or interdependent work activities in any of the designated critical habitat areas, except those activities distinctly specified.

5. Project Construction Description: [1] Structures and appurtenant features associated with construction of devices whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices and similar structures. Generally, construction takes place along the banks of the waterbody, on an existing structure, within the waterway, or over and across the waterbody.

a. Construction of New Facilities within a Waterbody : In some cases, construction within a waterbody requires constructing a small facility (5-feet x 5-feet) to house the measuring devices near the line of OHW or MHHW, and extending one or two PVC pipe(s) into the waterbody. An anchoring system may

[1] Information about project construction methods provided by personal communication with John Pell, Navigation Expert, Corps of Engineers, Regulatory Branch, and Eric Winters, Chief of Floating Plan, Corps of Engineers, Navigation Branch on February 16, 2000.

be necessary for the placement of the measuring device if the device is placed on a buoy. No fill associated with the facility may be placed in wetlands or waterward of OHW or MHHW. Work must take place during approved work windows. Dewatering, of any kind, is not covered under this programmatic biological evaluation. Work will only be accomplished during low flows and when possible outside the wetted perimeter, in the dry. Only situations where no land leveling will be required is covered by this informal programmatic consultation.

Scour chains may also be placed at or below OHW or MHHW. A scour chain is a chain that is inserted into the bank or stream bottom. The scour of the bank or stream channel is measured by a the number of chain links exposed over time. The chain link averages 1 ½ inches in length.

In marine/estuarine waters, a single pile or dolphin (not treated with creosote or pentachlorophenol) may driven into the bed of the waterbody and a protected wooden platform (up to 10 square feet) built on the top to house the scientific measuring devices. Gages may also be connected to a buoy and anchored with a concrete or steel anchor. Some placement of the measuring devices may necessitate placement of concrete blocks just landward of MHHW. The concrete blocks are typically used for the footing of the housing structure. The blocks may consist of a maximum of 5 concrete anchors or 2 concrete “ecology blocks”, both averaging 5 cubic yards total. Under this informal programmatic consultation, no uncured concrete shall come into contact with tidal waters. The new structure with the cured concrete foundation may be placed close to the waters’ edge, but not within the waterbody, and PVC pipe is extended from the structure into the waterbody.

Under the terms of this informal programmatic consultation, no uncured concrete shall come into contact with the waterbody in fresh waters. Similar to marine/estuarine waters, concrete blocks may be placed above OHW for the foundation of the housing with a PVC pipe extending from the structure into the waterbody. Only the bottom of the measuring device and the PVC pipes are located at or below OHW, and must be able to record the lowest low flows of the waterbody. Staff gages may placed within a waterbody to record water stages. This requires pounding a measuring gage several feet into the substrate of the waterbody and almost always takes place below the line of OHW. In some instances, gages may be placed on buoys with pre-cast concrete anchors dropped into the water body. No other construction is necessary for installation of a staff gage.

b. Construction of New Facilities Next to a Waterbody: Gaging, water quality or water quality testing structures placed next to the waterbody are generally placed on the banks of the waterbody at or near OHW or MHHW. The structure must be close enough to the waterbody so that the PVC piping or measuring device extends into the waterbody and can record the lowest low flows from that waterbody. No de-watering of any kind is covered under this informal

consultation. With the structure constructed next to the waterbody, no dewatering or rerouting of the water during construction is necessary. Work in these waterbodies are minor (may be only two PVC pipes). Under the terms of this programmatic biological evaluation, no fill will be placed waterward of OHW or MHHW. Fill may be placed in the adjacent upland areas close to but not at OHW or MHHW. If the structure is placed near OHW, but not at or within OHW, then the only structure in Corps of Engineers jurisdiction is the PVC piping.

c. Placement of Scientific Measuring Devices on Existing Structures: Generally, scientific measurement devices are placed within and/or on existing structures (i.e., gaging station, buoy, dock). If new equipment is installed, it generally consists of electronic measuring devices housed within the existing structure. In some cases, new equipment may require extending one or more PVC pipe(s) from the existing structure into the waterbody. In this case, new equipment is placed in the existing housing and new piping extended into the water from the existing structure.

d. Placement of Scientific Measuring Devices over Waterways: Sometimes measuring devices are located above waterbodies and extend out over the water during data collection periods. These structures are generally constructed in the uplands and linked with cable. A device hangs from the cable and is used to measure water depth and velocity using a weighted line that extends into the water. This type of activity only requires Federal permitting if it is constructed over a navigable waterway.

e. Placement of Scientific Measuring Devices on Buoys: Buoy placement whether in freshwaters, the Columbia River, or marine waters is relatively the same. The scientific measuring device will be attached to the buoy either on it or below it, depending on what the device is measuring.

1. Equipment used: The equipment used is the vessel to place the buoy (discussed under access); for small buoys, the buoy is a maximum of 4-feet radius (some as small as 1 foot radius), the anchor is made of fully cured concrete or steel, with a maximum weight of 1 ½ tons and a maximum size of 4 cubic yards, the line from anchor to buoy is either a combination of chain and nylon rope or chain and cable; for large buoys, the buoy is an average of 6-feet radius; the anchor is made of a fully cured concrete or steel (for steel sometime a regular boat anchor is used) up to 6 tons in weight and 10 cubic yards in size; the line from anchor to buoy is a large anchor chain or a combination of chain and cable. The buoy is made of either steel encased in close cell Styrofoam (plastic coating to ensure no water leakage), steel with a Styrofoam or other floatation material inside, or close cell Styrofoam only. The length of line for small or large buoys varies based on the scope needed. The scope refers to the ratio of length to depth based on currents in the waterbody. The average scope is a ratio of 5:1 line length to depth.

2. Access: Access to the buoy location is from a "Buoy Tender" or barge. A "Buoy Tender" is an open decked vessel with a mounted crane used for buoy placement. The buoy tender is at a minimum 65 feet in length. Barges may be as long as 500 feet. The length of barge used depends on the depth of buoy placement and size of buoy. For smaller buoys, a smaller vessel averaging 22 feet in length may be used.

3. Placement: The buoy is placed at a minimum depth of 10 feet at low water (fresh or marine). The maximum depth could be as much as 2,000 feet or more, such as in the Straits or Puget Sound. For typical placement of larger buoys from a buoy tender, the anchor is connected to a "trip wire" or "chalk" (a tripping device) on the side of the boat, the chain/nylon rope is "faked" or folded back and forth along the deck of the vessel, and the buoy is tied off along the same side of the boat as the anchor. The vessel is brought to a stop or an extremely slow speed. The anchor is lowered to be partially suspended in the water before release, minimizing splash disturbance. The "trip wire" is released, dropping the anchor allowing the chain/nylon rope to thread into the water and finally untying and releasing the buoy. If released with a crane versus a "trip wire", the anchor is also partially suspended in the water before completely released.

4. Timing: The placement of the buoy occurs in a matter of minutes. The anchor drops at a rate of 10 feet per second, no matter the size.

5. Buoy design standards: The Coast Guard and Washington State Department of Transportation regulate the size, the material, and the scope used for the buoy, line and anchor. Each U.S. Coast Guard District regulates specific standards for design and placement. The U.S. Coast Guard 13th District regulates all navigable waters in Washington State. Channel buoy design requirements are described in the Boat Handling Guide from Boat/U.S. Foundation in Alexandria, Virginia.

<u>f. Placement of Scientific Measuring Devices on a Pile or Dolphin:</u> Pile and dolphin placement is proposed as part of this programmatic biological evaluation only in marine/estuarine waters, excluding the mouth of the Columbia River (Baker Bay).

1. Equipment used: The equipment used includes a barge-mounted pneumatic pile driver, standard drop-hammer, or vibratory pile driver, barge averaging 50-by 100-feet (5,000 square feet), a tug boat, one pile or one dolphin (three piles with ¾" cable tie), either steel or wood treated (no creosote or pentachlorophenol) would be used for the pile and/or dolphin, signage (usually metal), shorelight, and a solar powered battery to be placed on the dolphin. The battery is used to power the shorelight and/or the recording devices or equipment.

2. Access: The pile placement is accessed by a barge positioned by a tug boat. Barges may be as long as 500 feet. The length of barge used depends on the depth of pile or dolphin placement. The barge anchors into position by dropping "spuds" – large steel piles that act as anchors at each corner of the barge. The tug boat is a maximum of 60 feet in length with engine power equivalent to an 100-foot long pleasure vessel.

3. Placement: The pile driving would be performed with a barge mounted, pile driver. A crane on the pile driver lowers a pile into the water until it rests in place on the bottom of the waterbody. The pile is attached to a special rail system that allows precise placement of the pile. A heavy weight runs along a similar track system. The weight is then repeatedly dropped onto the upper end of the pile, driving the pile into the bottom of the waterbody. For dolphins, three piles are driven in at an angle and tied together on top with a ¾" cable. The pile or dolphin is placed at a minimum depth of 8 feet high water and a maximum depth of 45 feet at high water (fresh or marine). After the pile or dolphin is driven, then the signage, shore light and battery are attached by hand using a welder, an hydraulic hammer or a drill (depending on material).

4. Timing: Total construction time is less than one day.

5. Design standards: Design standards for the signage and lighting requirements are regulated by the U.S. Coast Guard. Description of the U.S. Coast Guard Lighting Standards may be found in the Inland Navigation Lighting Provisions [33 CFR Parts 84, 87, 88, and 90]. Each U.S. Coast Guard District regulates specific standards for design and placement. The U.S. Coast Guard 13th District regulates all navigable waters in Washington State.

6. Action Area Description: The action area includes all fresh and marine/estuarine waters within Washington State.

a. For all Fresh Waters in Washington State *excluding* the Columbia River mainstem: The action area for the individual project includes: the measuring device; the existing in-water structure the device is connected to (i.e. pier, pile, or buoy); the new in-water buoy the device is connected to plus the anchor, anchor line, and a 5-foot radius for the buoy swing; the upland facility it is connected to; the upland access point; a 25-foot radius[2] around the measuring device, the in-water structure; and, for a distance of 2 miles downstream of the project area. The majority of the work takes place in uplands.

[2] The determination of impact area for potential water quality impacts is based on personal communication with John Malek, Sediment Management, Environmental Protection Agency, on May 10, 2000. Mr. Malek stated that typically turbidity impacts of a pile driving, anchor placement or the like would not exceed a 15-foot radius, a 25-foot radius is the maximum extent of impact, regardless of substrate type and currents at a project site.

b. For the Columbia River mainstem in Washington State *including* the Snake River and Baker Bay: The action area for the individual project includes: the measuring device; the existing in-water structure the device to connected to (i.e. pier, pile, or buoy); the new in-water buoy the device is connected to plus the anchor, anchor line, and a 5-foot radius for the buoy swing; the upland facility it is connected to; the upland access point; a 25-foot radius[3] around the measuring device, and the in-water structure for potential temporary water quality impacts; and for a distance of 2 miles downstream of the project area. The majority of the work takes place in uplands.

c. For All Marine/Estuarine Waters in Washington State *excluding* Baker Bay: The action area for the individual project includes: the measuring device; the existing in-water structure the device to connected to (i.e. pier, pile, or buoy); the new in-water buoy the device is connected to plus the anchor, anchor line, and a 5-foot radius for the buoy swing; the new pile or dolphin and platform; the upland facility it is connected to; the upland access point; a 25-foot radius[4] around the measuring device, and the in-water structure for potential temporary water quality impacts; and 1,000 feet radius[5] around the pile or dolphin for noise impacts associated with the pile driving. The majority of the work takes place in uplands.

7. Species and Habitat Information:

a. Species Present:[6]

1. For All Fresh Waters in Washington State, *excluding* the Columbia River mainstem and its tributaries: Puget Sound chinook salmon - status threatened (designated critical habitat); Hood Canal chum salmon - status threatened (designated critical habitat); Coastal/Puget Sound bull trout - status threatened; Ozette Lake sockeye salmon - status threatened (designated critical habitat); SW Washington/Columbia River/Coastal cutthroat trout - proposed threatened; and, Puget Sound coho salmon - candidate species.

2. For the Columbia River mainstem and its tributaries in Washington State *including* the Snake River and Baker Bay: Snake River sockeye salmon - status endangered (designated critical habitat); Snake River spring/summer chinook salmon - status threatened (designated critical habitat); Snake River fall chinook salmon - status threatened (designated critical habitat); Snake River steelhead - status threatened (designated critical habitat); Columbia River chum salmon - status threatened (designated critical habitat); Columbia River bull trout – status

[3] Ibid.
[4] Ibid.
[5] The determination of impact area for noise impacts associated with pile driving of 1000-foot radius around the pile is based on information provided in Feist, 1991.
[6] Other listed or proposed plants or animals may occur in the project area. However, this document addresses only listed or proposed fish species. Review of impacts to other listed or proposed species will be done on a case-by-case basis.

threatened; Lower Columbia River steelhead – status threatened (designated critical habitat); Lower Columbia River chinook salmon – status threatened (designated critical habitat); Middle Columbia River steelhead – status threatened (designated critical habitat); Upper Columbia River steelhead – status endangered (designated critical habitat); Upper Columbia River spring chinook salmon – status endangered (designated critical habitat); Upper Willamette River chinook salmon – status threatened (designated critical habitat); Upper Willamette steelhead – status threatened (designated critical habitat); and, SW Washington/Columbia River/Coastal cutthroat trout – proposed threatened.

3. For All Marine/Estuarine waters in Washington State, *excluding* Baker Bay: Puget Sound chinook salmon, status threatened (designated critical habitat), Hood Canal chum salmon, status threatened (designated critical habitat), Coastal/Puget Sound bull trout, status threatened, Ozette Lake sockeye salmon, status threatened (designated critical habitat), SW Washington/Columbia River/Coastal cutthroat trout, proposed threatened, and, Puget Sound coho salmon, candidate species.

b. Species Utilization: Refer to Appendix B - Species Life Histories.

8. Activity History and Status: The following table is a breakdown of the number of scientific measurement device verifications authorized by the Corps of Engineers. The breakdown is organized by year and waterbody. The waterbody includes all creeks, streams, and unnamed tributaries that flow into it unless otherwise noted. Each of the waterbodies is categorized as below:

a. Marine: All marine waters within Washington State (i.e., Pacific Ocean, Willapa Bay, Grays Harbor, Strait of Juan de Fuca, Strait of Georgia, Puget Sound, Hood Canal, Sammish Bay, Skagit Bay, Totten Inlet, Dabob Bay, Commencement Bay, etc.). Because of the design of the Corps database, it was not possible to separate out tidal areas from minor freshwater creeks, streams, and unnamed tributaries that flow into these waterbodies.

b. Fresh: All fresh waters within Washington State including all rivers, tributaries, lakes, and reservoirs (regardless of size) and excluding the Columbia River mainstem. (i.e., Snoqualmie River, Skagit River, Puyallup River, Nisqually River, Cowlitz River, Yakima River, Wenatchee River, Snake River, Pend Oreille River, Lake Washington, Lake Sammamish, Lake Chelan, Moses Lake, Baker Lake, Spanaway Lake, etc).

c. Columbia River: Mainstem Columbia River within Washington State, including the Snake River, Baker Bay, and lakes and reservoirs (i.e. Lake Entiat, Lake Wallula, Franklin D. Roosevelt Lake, Priest Rapids Lake, etc.). Data for all tributaries are included under “fresh waters”.

To determine the number of authorized device installation verifications, all finalized permit actions were queried against the key word “NWP 5” and cross-

referenced with the work type "scientific measurement device." The cross-referencing ensures that the activity is properly categorized and each authorization is only counted once. The following data includes before- and, when applicable, after-the-fact authorizations.

The 1999 data from WDFW recorded 51 research projects. Research projects as defined by WDFW include dataloggers, dissolved gas monitoring devices, downstream and upstream migrant traps, egg/alevin sampling, videotaping or photography inside culverts, piezometers, scour chains and monitoring, soil borings, stilling wells, and weir gages. These activities would be considered "scientific measuring devices" by Corps definition. Of the "research projects" identified by WDFW, all but the following actions are covered under this informal programmatic consultation: downstream and upstream migrant traps, egg/alevin sampling, and soil borings. The majority of these actions are done in non-navigable waters of the U.S. and are not regulated under Section 404 of the Clean Water Act. In comparing the Corps database with one year of data from WDFW (1999) for research projects, the Corps database represents less than 1 % of the actual number of scientific measuring devices.

Table 1: Historical Record of Corps Authorization of Scientific Measurement Devices

WATERBODY	1995	1996	1997	1998	1999
Marine	3	0	0	1	0
Fresh	1	2	1	1	1
Columbia River	0	0	1	3	0
TOTAL	**4**	**2**	**2**	**5**	**1**

Because no notification is required for NWP 5, the Corps acknowledges that tracking of scientific measuring devices has been inconsistent and infrequent. In light of the recent listings under ESA, the Corps proposes to track these activities as outlined in the "Programmatic Biological Evaluation Notification and Tracking Description".

9. Environmental Baseline: Refer to Appendix C - Environmental Baseline.

10. Effects of the Action:

a. Direct Effects – Measuring Device Placement or Replacement:

1. Water quality (Turbidity): Temporary water quality impacts may occur with the placement of the structure, measuring device (including scour chains or gages). Placing a measuring device within the wetted perimeter would suspend sediment within the water column for some period of time, not to exceed 1 hour. These sediments would drop out relatively rapidly at or directly downstream of where a measuring device was placed. Since no material is removed to pound the measuring device in, water quality impacts are expected to be discountable

and/or insignificant. When a larger structure is placed near OHW or MHHW, a concrete structure may be placed on top of the ground. Under this informal programmatic consultation, no uncured concrete shall come into contact with the waterbody. This informal programmatic consultation does not cover activities where the land will be leveled or grading or where the fill is placed at or waterward of OHW or MHHW. Construction would take place during low flows (or low tides) and sediments will be re-suspended within the water column once flows return or the tide comes back in. This turbidity would dissipate relatively rapidly, not to exceed 2 hours after inundation is achieved. Since the area that will be disturbed is in the uplands and is covered with the small structure, water quality impacts should be minor and dissipate altogether after the area has stabilizes. As outlined in Appendix F- Implementation Conditions, erosion control measures must be taken to insure that no sediments enter the water column from the construction activities. The PVC pipes that may be placed in the water are not expected to effect the water quality in the project area as they are suspended above the substrate and are used exclusively to measure water quality and quantity parameters. They house devices that extend into the water to measure temperature, turbidity, dissolved oxygen, etc. and the level of the water. They do not collect or extract water (or anything else) into the PVC pipe.

2. Water Quality (concrete): Under the terms of this informal programmatic consultation, no uncured concrete shall come into contact with either fresh or marine/estuarine waters. Wet concrete causes a change in the pH of the water due to the lime in the concrete, resulting in the water that comes into contact with the concrete becoming “basic” in fresh water systems. Basic water can adversely impact fish. These effects may be lessened in marine/estuarine waters, as the lime has more options to bind to aside from the water in marine/estuarine systems. If semi-wet concrete has a partially cured “skin” then the lime will leach at a slower rate.[7] Cured concrete in fresh water systems releases carbonate (CO_3^{2-}) through natural weathering processes. Carbonate reacts with hydrogen (H+) to form biocarbonate (HCO_3-) and/or carbonic acid (H_2CO_3). A product of these reactions is an increase in pH, thereby causing the water that comes into contact with the weathering concrete to become basic.[8] Under this informal programmatic consultation, no fill is allowed waterward of OHW or MHHW. In fresh waters, the only concrete that would come into contact with the water would be cured concrete used for an anchoring system (up to 10 cubic yards) or if the water raises above OHW during flood and storm events. With only cured concrete coming into contact with the water and the limited amount or exposure of the concrete to the water, the impacts of the weathering concrete to pH levels in the water are insignificant and/or discountable. In marine waters, the only cured concrete would come into contact with the water

[7] Impacts associated with concrete were obtained through personal communication with Hal Michael, Fisheries Biologist, Washington Department of Fish and Wildlife on February 3, 2000.
[8] Information on the impacts of the natural weathering of concrete was obtained through personal communication with MaryAnn Baird, Soil Scientist, U.S. Army Corps of Engineers, Regulatory Branch.

used for an anchoring system or structure (up to 10 cubic yards) or if the water raises above MHHW during extreme high tides and storm events. With the limited amount and/or exposure to the water of the cured concrete, the impacts of the weathering concrete to pH levels in the water are insignificant and/or discountable.

3. Water Quantity: No changes to flow and hydrology and overall watershed conditions are anticipated with these types of activities.

4. Habitat Health: The gages, devices, and/or structures used to measure data will not be constructed in or adjacent to (within 300-feet) listed, proposed or forage fish spawning habitat, or vegetated shallows - including eelgrass beds, kelp beds, or other macroalgae. No dewatering of the stream or waterway is covered under the terms of this programmatic biological evaluation. As outlined in Appendix F – Implementation Conditions, no woody riparian vegetation will be degraded or removed and any disturbed herbaceous areas must be revegetated as outlined in the "Revegetation Guidelines" of Appendix F. Therefore, impacts to the substrate of the stream, large woody debris (LWD) found on the banks or beaches, pool frequency and quality, off-channel habitat and refuge areas will be insignificant and/or discountable.

<u>b. Direct Effects – Scientific Measuring Devices on Buoys:</u>

1. Water quality (anchor placement): Temporary water quality impacts may occur with the placement of buoys as scientific measuring devices when the anchor drops and a small amount of sediment is temporarily suspended in the water column. Buoys are usually placed during "slack tide" when the water is relatively still. Because the anchor drops in a matter of seconds and settles, sediment suspension is unlikely to exceed a radius of 25 feet from the anchor and would settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. If the anchor is not installed properly or the weight is not sufficient, the anchor could drag along the substrate, causing additional sediment suspension. The Corps' experience is that this is rare. Buoys will be anchored securely so that the anchor line does not drag. All temporary water quality impacts associated with the anchor placement are insignificant and/or discountable.

2. Water quality (propwash): The boat placing the buoy is likely to cause some sediment suspension associated with propwash. The boat is stopped or moving extremely slowly during anchor placement so the disturbance with the propwash is extremely small. If a tug and barge are used, the placement is done very quickly (matter of minutes) and the work is done in the approved work window when listed, proposed or forage fish are least likely to be present. Any turbidity associated with propwash from the boat or tug and barge would settle out of the water column to background levels in no more than an hour, depending on depth,

sediment type and currents. All temporary water quality impacts are insignificant and/or discountable.

3. Habitat Health: If a buoy is placed over or adjacent to vegetated shallows, the placement of the buoy and propwash from the vessel placing the buoy could destroy areas of the vegetated shallows. Vegetated shallows provide refuge for juvenile salmonids and support forage species that the listed or proposed fish species are dependent upon, such as invertebrates for juvenile salmonids and forage fish for adult salmonids. For example, herring spawn in eelgrass beds in marine areas. Boat activity near or adjacent to vegetated areas has been documented to damage and/or destroy the vegetated areas. (NOAA, 1998) To be covered by this informal consultation, the buoys will be placed so that the vessel and buoy are not over or adjacent to vegetated shallows. The substrate may support benthic invertebrates that juvenile listed or proposed fish species are dependent upon for forage. Buoy anchors will be weighted and installed so that the anchor line does not drag, disturbing the substrate and associated habitat. Using this method of installation, impacts to habitat health are insignificant and/or discountable.

c. Direct Effects – Scientific Measuring Devices on Piles or Dolphins: The placement of one pile or one dolphin applies only to marine/estuarine waters excluding for the mouth of the Columbia River (Baker Bay). Because the effects are relatively the same for all the listed or proposed fish species, the effects analysis does not distinguish between species type. Effects of the placement of one pile or dolphin when used as scientific measuring devices are outlined below:

1. Water Quality (pile driving, spud placement, and propwash): Pile driving and spud placement to anchor the barge will have a temporary impact on water quality. As each pile is driven or each spud is placed into the substrate, a turbidity plume is created. The plumes will be small, localized and will dissipate quickly. Based on discussions between the Corps, USFWS, and NMFS in Informal Consultation Batch Meeting for structures in Lake Washington, the "plume" is unlikely to exceed a radius of 25 feet from the pile or dolphin and would settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. Propwash impacts would only occur when the tug is either situating the barge in place or removing the barge. The work is done in the approved work window when listed, proposed or forage fish are least likely to be present. Any turbidity associated with propwash from the tug and barge is relatively short-term and would settle out of the water column to background levels in no more than an hour, depending on depth, sediment type and currents. To ensure that sediment suspension impacts are discountable, the pile driving for the pile or dolphin and the anchoring of the barge will only occur during approved work windows when listed, proposed or forage fish are least likely to be present. The impacts to water quality due to pile driving and spud placement are insignificant and/or discountable.

2. Water Quality (pile treatment and slag): No piles treated with creosote or pentachlorophenol will be used in marine/estuarine waters, in order to be covered under this informal consultation. Studies by NMFS have shown that the primary metal of concern in pile treatment is copper as it is the “most acutely toxic”. (NMFS, 1998.) Copper has been shown to be the most actively leaching metal with arsenic and chromium rating second. (Warner and Solomon, 1990.) About 300 compounds including polycyclic aromatic hydrocarbons (PAHs) – which are also known to be very toxic and bioconcentrate - are found in creosote. (NMFS, 1998) Exposure to these chemicals could result in the death of both adults and juveniles of the listed or proposed fish species or prey organisms. (NMFS, 1998.) Dioxins are found in pentachlorophenol. When wood is treated with pentachlorophenol, the dioxins are likely to leach into the water column. Exposure of female fish species, including salmon and trout, to dioxins and dioxin-like contaminants cause increased larval mortality. (Hornung, et al, 1998). There is the potential that slag will enter the water column when signs are welded to the pile or dolphin. The amount of slag from welding one sign would be no more than 1 square inch. This amount is so small that any impact to water quality is insignificant and/or discountable. Using these methods of installation, adverse effects associated with pile treatment and/or slag are insignificant and/or discountable.

3. Habitat Health (noise from pile driving): Pile driving can cause a considerable amount of noise. The impact of the weight causes sound waves to radiate outward. Studies conducted in estuarine areas in Puget Sound indicate, though inconclusively, that the sound waves generated by pile driving frighten juvenile pink and chum salmon in estuaries away from the pile driver (Feist, 1991). The effects of the pile driving were observed up to 1000 feet away. The juvenile salmonids fled, and remained away from the area during active pile driving, and for a short time after the pile driving stops (Feist, 1991). No conclusive evidence was found to show any long term effects on juvenile growth rates or feeding patterns from the sound waves created from pile driving (Feist, 1991). Tests showed the fish had been actively feeding during the pile driving (Feist, 1991). Juveniles apparently moved to other feeding areas and returned shortly after the pile driving ceased (Feist, 1991). There is no reason to believe that listed or proposed salmonids would act differently. In order to ensure that adult and juvenile listed or proposed fish species will not be disturbed by the noise pile driving, the pile driving for the pile or dolphin will only occur during approved work windows when listed, proposed or forage fish are least likely to be present. Using this method of installation, impacts to water quality due to pile driving are insignificant and/or discountable.

4. Habitat Health (pile driving impacts to vegetated shallows): The pile driving and any propwash associated with the tug boat or pile driving barge could destroy vegetated shallows. The vegetated shallows support forage species that the listed or proposed fish species are dependent upon, such as herring

spawning in eelgrass beds in marine areas. Boat activity in or adjacent to vegetated shallows has been documented to damage and/or destroy vegetated shallows. (NOAA, 1998) To be covered by this informal consultation, the pile or dolphin will be placed so that the tug boat, barge, and pile/dolphin are not over or adjacent to vegetated shallows and the barge will not ground out. Using this method of installation, impacts to habitat health are insignificant and/or discountable.

d. Indirect Effects: There are no effects that would result from the placement or operation of the measuring devices later in time. With no water being removed or added to the waterbody (stream, river, lake, or marine/estuarine waters), there is no change in the water quantity over time due to the placement or operation of the gages or other devices. Devices do not add any chemicals to the stream. Impacts to pH levels from cured concrete are insignificant and/or discountable because of the limited amount and/or exposure. Any change in water quality over time due to their placement or operation of the measuring devices will be insignificant and/or discountable.

e. For all other pathways and indicators not specifically mentioned above, the activity will not alter the present environmental baseline.

f. Determination of Effect: Minor Discharges associated with Scientific Measurement Devices may affect by are not likely to adversely affect listed fish species and designated critical habitat identified above, and will not jeopardize proposed fish species or destroy or adversely modify proposed critical habitat identified above, provided that:

1. In All Fresh Waters *excluding* Columbia River mainstem:
- Work is done within the approved work window.
- No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or spawning habitat for listed or proposed fish species.
- No uncured concrete shall come into contact with the waterbody.
- No new piling is placed.
- No land leveling or grading is conducted.
- No fill is placed in wetlands or waterward of OHW.
- Work does not include weirs and flumes.
- Placement does not require the de-watering of a stream or waterbody.
- Work will be done during low flow and when possible in the dry.

2. In the Columbia River mainstem *including* Snake River and Baker Bay:
- Work is done within the approved work window.
- No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or spawning habitat for listed**,** proposed or forage fish species.
- No uncured concrete shall come into contact with the waterbody.

- No new piling is placed.
- No land leveling or grading is conducted.
- No fill is placed in wetlands or waterward of OHW or MHHW.
- Work does not include weirs and flumes.
- Placement does not require the de-watering of a stream or waterbody.
- Work will be done during low flow and when possible in the dry.

3. In All Marine/Estuarine Waters *excluding* Baker Bay:

- Work is done within approved work window.
- No work is done over or adjacent to vegetated shallows or spawning habitat for forage species.
- No uncured concrete shall come into contact with the waterbody.
- Only one new pile is placed.
- The pile is not treated with creosote or pentachlorophenol.
- No land leveling or grading is conducted.
- No fill is placed in wetlands or waterward of MHHW.
- Work does not include weirs and flumes.
- Placement does not require the de-watering of a waterbody.
- Work will be done during low tide and when possible in the dry.