

# **Pacific Northwest Aquatic Monitoring Partnership Inventory of Aquatic Monitoring Activities**

**BPA Project Number 2004-002-00  
Exp PNAMP/StreamNet Funding  
Contract # 28571**

## **Project Completion Report**

by

**Adam J. Storch**

Pacific States Marine Fisheries Commission  
205 SE Spokane Street, Suite 100  
Portland, OR 97202

December 29, 2006

## Introduction

Beginning in February 2006 the Pacific States Marine Fisheries Commission (PSMFC), StreamNet project, in cooperation with the Pacific Northwest Aquatic Monitoring Partnership (PNAMP), implemented a pilot project to begin cataloging aquatic and related monitoring activities in the Pacific Northwest. The inventory covered a range of aquatic resource monitoring activities in Oregon, Washington, Idaho, western Montana, and northern California including fish population monitoring, aquatic habitat monitoring, ecological monitoring, and restoration project effectiveness monitoring. The primary goal of this project was to develop a novel and easily accessible resource to:

- (1) facilitate inter-agency coordination and efficiency of monitoring;
- (2) avoid redundancy of monitoring effort;
- (3) help elucidate where monitoring may be adequate, deficient or excessive; and
- (4) provide information to inform planning and decisions on developing and funding monitoring programs.

Specific objectives were to:

- (1) Provide an online questionnaire developed to capture information describing aquatic resource monitoring activities throughout the Pacific Northwest;
- (2) populate a database by soliciting responses to the questionnaire, and extracting information from other sources; and
- (3) develop an output application allowing users to access information contained in the inventory database.

The following describes activities and methodologies undertaken to achieve project objectives, results to date, difficulties encountered, and recommendations for the future. Values included in this report are from 2 August through 11 December 2006.

## Methodologies and Accomplishments

### *Survey Development*

Design of the PNAMP questionnaire began in February 2006. PSMFC/StreamNet, along with input from other PNAMP member agencies, developed questions and a draft layout of the survey. Under existing StreamNet funding, this conceptual model was used to produce an interactive online version of the questionnaire. After the interface was functional, feedback was requested from PNAMP members active in development of the survey. In early August 2006 the questionnaire was made accessible to participants (<http://pnampsurvey.streamnet.org>).

The PNAMP questionnaire (which is still available and functional as of the date of this report) was comprised of three main sections: (1) preliminary information, (2) descriptions of monitoring activities, and (3) secondary information. Presented in this order, the first two sections were required, while the third was optional. The questionnaire was organized so the most important information (i.e., who, what, and where; included in sections one and two),

implicit in the project objectives, was captured first, increasing the likelihood that at least this essential information was reported.

In the preliminary information section, respondents were asked to provide basic contact information including name, affiliation, title, and phone number. Additionally, if the respondent was not supervising the monitoring activity he or she was reporting, a second sub-section asked for contact information for the person in charge of monitoring. After entering preliminary information, respondents previously having completed one or more alternative surveys (e.g., Collaborative Systemwide Monitoring and Evaluation Project; CSMEP) could bypass remaining sections. Relevant information subsequently was to be extracted from those specified sources and incorporated into the PNAMP survey (see Difficulties and Recommendations).

The second section asked respondents to describe specifically their monitoring activities (e.g., monitoring type, parameters/indicators sampled, taxa of interest, monitoring locations, etc.). Of the three primary sections, the second required the greatest input by respondents. This was due largely to the request that participants enter locations for each of the monitoring activities described. To ease this process, respondents were given options allowing them to provide location information in different formats (latitude and longitude; USGS Hydrologic Unit Code (HUC); Universal Transverse Mercator (UTM), routed-hydrography, and estuarine regions specified by standard names), or enter contact information for a person who subsequently could provide the location information.

The third, optional, section requested information including funding sources, partners involved, if and where data are available, and project duration. A complete list of specific questions asked in each primary section is presented in Appendix A.

### *Initial Activities*

A project supervisor (Portland, OR) and two technicians (1 each in Olympia, WA and Corvallis, OR) were hired and began work between 26 June and 17 July 2006. The pilot study was planned originally to include a technician in Idaho; however, due to the short duration of proposed effort and lack of qualified applicants, no technician was hired in that state. Initial tasks of the supervisor and technicians included:

- 1) developing contact lists of potential respondents in Idaho, Montana, Oregon, Washington, and northern California;
- 2) obtaining and when possible extracting information from other sources (i.e., surveys conducted previously) to prepopulate the survey database;
- 3) developing a Microsoft Access-based “work log” to track and comment on the progress of respondents; and
- 4) composing a letter of invitation, describing briefly the survey and its purpose, and encouraging participation.

Contact lists were developed primarily by Internet search and from existing lists of relevant personnel within various organizations. Technicians located in Oregon and Washington were responsible for locating and documenting the information of contacts in their respective states;

the project supervisor compiled contacts for Idaho, Montana, and California. Whenever possible, a contact's affiliation, title, first and last names, phone number, e-mail address, and mailing address were documented. Contacts were screened as thoroughly as possible to ensure individuals were appropriate to participate in the survey.

The project supervisor developed a Microsoft Access-based “work log,” to coordinate the efforts of technicians in documenting progress of respondents to the survey. The work log documented specifically: 1) contact information; 2) new contacts; 3) correspondence with respondents and potential respondents (e.g., dates, times, notes, etc.); 4) progress of respondents; and 5) any general comments.

To prepopulate the survey database, we attempted to locate and extract data from surveys conducted previously containing information similar to that requested in the PNAMP survey. Because of difficulties encountered, mining of those databases was not completed. Of six sources recommended by others for use in prepopulating the survey database, only two, the Ecotrust "WOCI" database and the CSMEP survey databases, were found to contain useable information. Initially, considerable time was spent extracting information from the Ecotrust database. However, because updates currently are being applied (as of the date of this report), the incorporation of information from the Ecotrust database into the PNAMP survey database was deferred. Population of the PNAMP database with information from the CSMEP database also is incomplete at this time.

To advertise the PNAMP survey and encourage participation, an invitational e-mail message was drafted. The message contained information introducing PNAMP, describing the purpose and objectives of the project, and directing potential respondents to the online survey. The message also contained contact information for the supervisor and technicians, and a brief note thanking the recipient for their cooperation.

### *Chronology of Core Activities*

Below is a chronology of activities carried out by the PNAMP Coordinator and PSMFC/StreamNet. Throughout the time period indicated, we updated work logs daily to ensure accurate contact information and to track the progress of respondents.

On 2 August 2006 the PNAMP Coordinator sent a preliminary e-mail message to members of the PNAMP Steering Committee requesting they encourage the participation of PNAMP partner agencies. Attached to this e-mail message was the letter of invitation developed previously. The invitational e-mail also was sent to other people with known interest in PNAMP activities.

Beginning on 8 August 2006, the invitational e-mail was sent to potential respondents from contact lists we developed. The message was sent to other contacts as found.

To gain preliminary feedback and to elucidate problems that may have been encountered by respondents, after e-mail messages had been sent we contacted by phone respondents who had only logged-in to the online survey but not completed it.

On 17 August 2006, a brief follow-up e-mail message was sent to people contacted by the PNAMP Coordinator and survey personnel who had not yet entered information into the survey.

During 23 August to 26 August 2006, the preliminary e-mail of invitation was sent to several contacts not previously included in contact lists.

From 24 August to 11 December 2006 we called contacts who had not responded, inquiring about their lack of response to the survey, and providing additional information when necessary. Further, for some respondents, we completed the survey using provided documentation (i.e., various reports).

Beginning on 5 October 2006, the project supervisor focused approximately 85% of his effort obtaining location data from persons listed as contacts by respondents to the survey (see *Survey Development*), and standardizing data for use in the output application (see *Survey Output*)

### *Survey Modifications*

Since being made available to participants, the online questionnaire underwent several modifications. Many respondents expressed interest in being able to review questions asked in the survey (i.e., via a printable version) prior to completing the survey online. To accommodate this request, the project supervisor developed a document version of the questionnaire which was made available for download at the log-in page of the survey website. The current version is shown in Appendix A.

To simplify entering the names of taxa (required when specific monitoring types were selected), species lists for fishes and other taxa were expanded to include many species monitored frequently in the Pacific Northwest.

Originally, to identify a particular activity as effectiveness monitoring, the user was required to enter manually a brief title denoting the specific type of effectiveness monitoring. To standardize responses, and to increase the ease with which respondents might enter this information, a multiselect list containing common effectiveness monitoring types was incorporated into the survey interface.

To simplify entering location information for respondents conducting monitoring activities in estuarine areas, an option was added enabling the user to select a particular estuarine region from a multiselect list. This effectively eliminated the need for these respondents to enter potentially large numbers of data (e.g., field sampling points).

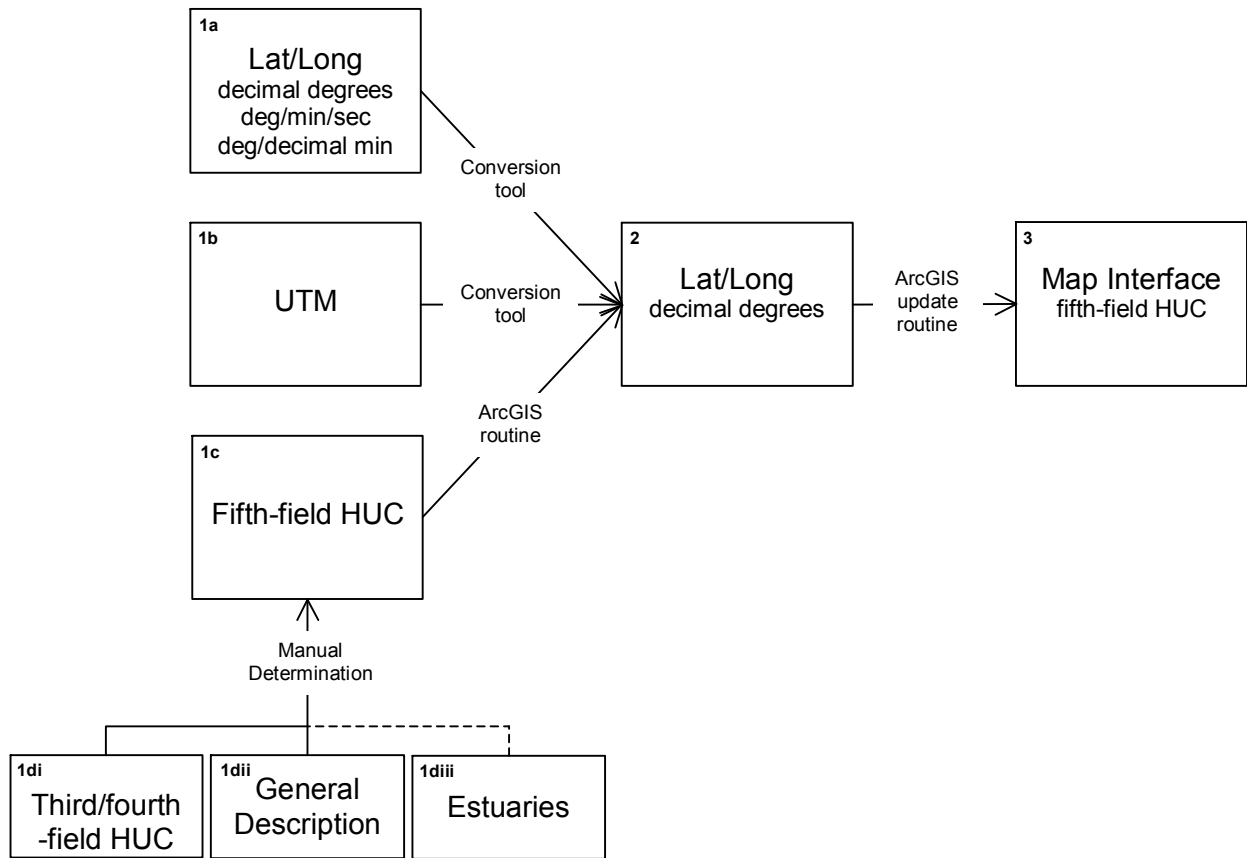
### *Survey Output*

A preliminary output tool was developed by PSMFC/StreamNet staff, enabling users to access information in the survey database via the Internet. By selecting a watershed (5th-field USGS hydrologic unit) on an interactive map, the user can find and view available information pertaining to various monitoring activities conducted in that watershed.

Because location data were entered into the survey or received from contacts in various formats, we derived the fifth-field HUCs necessary for use with the output interface. Figure 1 shows various location data formats that required conversion, and the general approach used to standardize the information.

To associate polygons displayed in the map-based output tool (Figure 1, box 3) with descriptions of monitoring activities, an ArcGIS routine was run to identify fifth-field HUCs from points (latitude and longitude; decimal degrees; Figure 1, box 2) specific to monitoring records. To this end, location information not entered or obtained as points in decimal degrees were derived from other forms. For points provided in units of degrees/minutes/seconds or degrees/decimal minutes, and UTM coordinates, simple conversion tools were used (Figure 1, boxes 1a and b). For fifth-field HUCs entered directly into the survey or solicited from contacts, an ArcGIS routine was run to determine a central point (centroid) within the specified polygon (Figure 1, box 1c). In addition, some respondents provided third and fourth-field HUCs, general descriptions of sites, or the names of specific estuaries. For third- and fourth-field HUCs, we determined all fifth-field HUCs comprising the specified third-field HUC or fourth-field HUC; or when the names of water bodies also were provided, the particular fifth-field HUC(s) in which that water body fell (Figure 1, box 1di). Fifth-field HUCs also were identified manually from general descriptions of locations using ArcGIS (Figure 1, box 1dii). Centroids were then identified for fifth-field HUCs determined from third- and fourth-field HUCs and general descriptions.

Location information provided as the name of an estuary can be processed following procedures employed for third- and fourth-field HUCs and general descriptions (Figure 1, box 1diii). However, due to difficulties inhibiting the aggregation of fifth-field HUCs and estuaries into a single GIS coverage, survey responses associated with estuaries were not made available via the output tool.



**Figure 1.** Procedures employed to standardize location data for incorporation into the map-based output tool. Dashed line from the “Estuaries” box indicates a convention to standardize data in that category has not yet been established.

## Results

We contacted 3,128 individuals either by phone, e-mail, or both. Of these, 624 (20%) responded to the survey by logging-in only, contributing one or more complete records, or indicating they completed previously a different survey. Attempts were made to contact 1,308 individuals by telephone. In 600 (46%) instances, messages were left requesting a return telephone call. Those who logged-in only (284 individuals) did not complete the survey for reasons<sup>1</sup> including: (1) they felt the survey did not apply to their work (i.e., long-term monitoring); (2) their work did not fall into the geographical scope of the survey; or (3) they did not have time to complete the survey. These also were common responses made by those who did not access the survey. A total of 153 (51%) of the 302 respondents entering complete records classified their activities as effectiveness monitoring, accounting for 242 (34%) complete records.

The greatest participation (see Tables 1 and 2, and Appendix B), occurred in Oregon, followed in decreasing order by Washington and Idaho; a trend consistent with the number of people contacted in each of these three states. Few responses were received from Montana and California; however, effort to solicit participation (i.e., the number of people contacted) in those states was considerably less than in Oregon, Washington, and Idaho (Tables 1 and 2).

Ratios of the number of responses to the number of people contacted generally were low in Oregon, Washington, and Idaho. Contrary to raw counts, comparisons of this standard metric among states indicated increased effort did not necessarily result in a greater number of responses (Tables 1 and 2).

Respondents in Oregon most often indicated they completed other surveys previously (22 individuals); approximately half that number (12 individuals) in Washington and Idaho combined marked that they had completed another survey (Table 1b).

---

<sup>1</sup> Based on phone or e-mail correspondence with specific individuals



**Table 1.** Counts, proportions, and the ratio of count to people contacted for individuals (a) entering complete records and (b) completing other surveys previously. Numbers of people contacted includes those who stated they are not involved in any monitoring activities. See appendix for definitions of different response categories (e.g., Complete Records).

a.		Individuals Entering Complete Records		
State	No. People Contacted	Count	Proportion of Total Count	Count/Contacted
OR	1,752	171	0.57	0.10
WA	724	97	0.32	0.13
ID	574	28	0.09	0.05
MT	59	4	0.01	0.07
CA	19	2	0.01	0.11
Total:	<b>3,128</b>	<b>302</b>		

b.		Individuals Completing Other Surveys		
State	No. People Contacted	Count	Proportion of Total Count	Count/Contacted
OR	1,752	22	0.65	0.01
WA	724	8	0.24	0.01
ID	574	4	0.12	0.01
MT	59	0	0.00	0.00
CA	19	0	0.00	0.00
Total:	<b>3,128</b>	<b>34</b>		

Secondary information was associated with 48% and 46% of the records completed in Oregon and Washington, respectively, while 30% of completed records in Idaho were linked with secondary data (Table 2b).

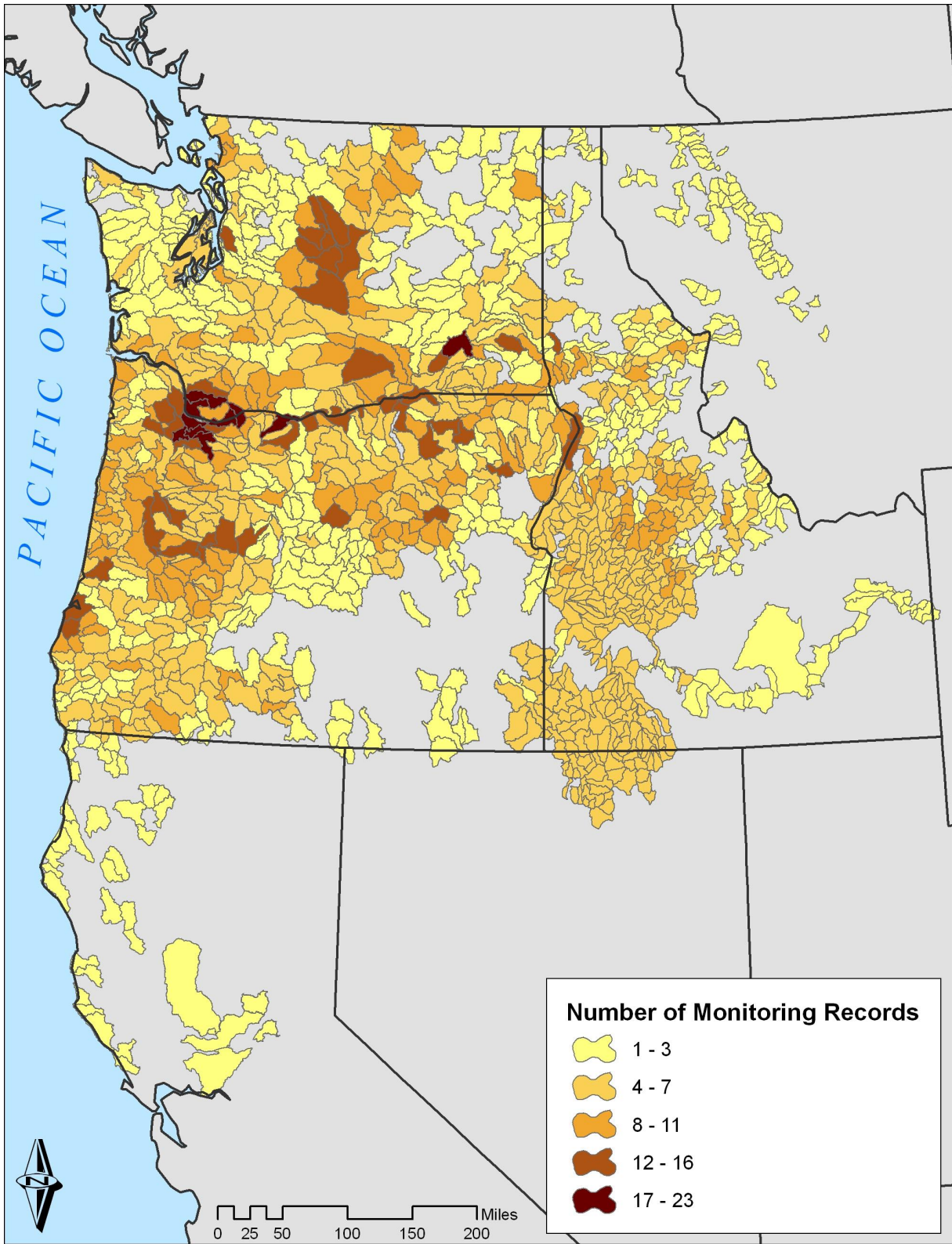
**Table 2.** Counts, proportions, and the ratio of count to people contacted for records (a) completed and (b) completed with secondary information. Numbers of people contacted includes those who stated they are not involved in any monitoring activities. See appendix for definitions of different response categories (e.g., Complete Records).

a.		Complete Records		
State	No. People Contacted	Count	Proportion of Total Count	Count/Contacted
OR	1,752	376	0.53	0.22
WA	724	252	0.36	0.35
ID	574	60	0.09	0.11
MT	59	16	0.02	0.27
CA	19	2	0.00	0.11
Total:	<b>3,128</b>	<b>706</b>		

b.		Complete Records with Secondary Information		
State	No. People Contacted	Count	Proportion of Total Count	Count/Contacted
OR	1,752	179	0.56	0.10
WA	724	116	0.36	0.16
ID	574	20	0.06	0.04
MT	59	4	0.01	0.07
CA	19	2	0.01	0.11
Total:	<b>3,128</b>	<b>321</b>		

In Washington, the greatest numbers of complete records (i.e., those with useable location data) were reported for monitoring activities conducted in the central portion of the state and areas along the Columbia River. In Oregon, the greatest densities were reported in northern and western regions; few records were obtained from the Oregon Closed Basins. Complete records reported in Idaho occurred largely in central and southwestern watersheds, with few entries describing monitoring efforts in the panhandle and the Upper Snake Basin. A relatively small number of records were captured in western Montana and Northern California; complete descriptions of monitoring activities in those areas were, in general, sparse (Figure 2).



**Figure 2.** Distribution by watershed (fifth-field HUC) of complete monitoring records entered into the PNAMP survey. Monitoring activities conducted in certain estuarine areas, or for which location data have not yet been obtained (132 records) are not represented.

Overall, the most frequent monitoring type entered in the inventory was “Biological: fish (36%), followed by “Water quality” (21%; Table 3). All other categories were below 10%. By state, the “Biological: fish” category represented from 19% (MT) to 48% (ID) of completed records, and the “Water quality” type represented from 0% (CA) to 23% (WA). Of the remaining monitoring types, only “Water quantity” (36 records, 14%, WA) and “Physical habitat: riparian” (1 record, 50%, CA) exceeded 10% in any state.

**Table 3.** Distribution of frequencies at which specific monitoring types were entered into the inventory questionnaire. Values in bold are the number of records for which the indicated monitoring type was selected. Values in parentheses are the proportions of column totals contributed by the monitoring type specified. Due to rounding, the sum of proportions within a column may not equal 1.0.

Monitoring Type	OR	WA	ID	CA	MT	Total
Biological: fish	<b>135</b> (0.36)	<b>88</b> (0.35)	<b>29</b> (0.48)	<b>1</b> (0.50)	<b>3</b> (0.19)	<b>256</b> (0.36)
Water Quality	<b>80</b> (0.21)	<b>59</b> (0.23)	<b>6</b> (0.10)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>146</b> (0.21)
Water Quantity	<b>20</b> (0.05)	<b>36</b> (0.14)	<b>5</b> (0.08)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>62</b> (0.09)
Physical habitat: in-stream	<b>35</b> (0.09)	<b>16</b> (0.06)	<b>5</b> (0.08)	<b>0</b> (0.00)	<b>5</b> (0.31)	<b>61</b> (0.09)
Biological: macroinvertebrates	<b>22</b> (0.06)	<b>12</b> (0.05)	<b>4</b> (0.07)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>39</b> (0.06)
Biological: vegetation	<b>19</b> (0.05)	<b>15</b> (0.06)	<b>1</b> (0.02)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>35</b> (0.05)
Physical habitat: riparian	<b>16</b> (0.04)	<b>4</b> (0.02)	<b>6</b> (0.10)	<b>1</b> (0.50)	<b>1</b> (0.06)	<b>28</b> (0.04)
Other	<b>18</b> (0.05)	<b>5</b> (0.02)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>23</b> (0.03)
Biological: birds	<b>8</b> (0.02)	<b>4</b> (0.02)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>12</b> (0.02)
Physical habitat: estuarine	<b>3</b> (0.01)	<b>6</b> (0.02)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>9</b> (0.01)
Biological: amphibians/reptiles	<b>6</b> (0.02)	<b>2</b> (0.01)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>9</b> (0.01)
Physical habitat: freshwater wetland	<b>6</b> (0.02)	<b>1</b> (0.00)	<b>1</b> (0.02)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>8</b> (0.01)
Physical habitat: upland	<b>4</b> (0.01)	<b>2</b> (0.01)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>7</b> (0.01)
Soil and Sediment Quality	<b>3</b> (0.01)	<b>0</b> (0.00)	<b>2</b> (0.03)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>5</b> (0.01)
Biological: other	<b>1</b> (0.00)	<b>1</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>3</b> (0.00)
Physical habitat: lake/pond/reservoir	<b>0</b> (0.00)	<b>1</b> (0.00)	<b>1</b> (0.02)	<b>0</b> (0.00)	<b>1</b> (0.06)	<b>3</b> (0.00)
Biological: mammals	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)
<b>Total</b>	<b>376</b>	<b>252</b>	<b>60</b>	<b>2</b>	<b>16</b>	<b>706</b>

Respondents in all states chose largely to enter contact information as a means of reporting location information (greater than 35% of all records per state, and of the total records captured) rather than entering actual location data. This was followed, in decreasing order, by latitude/longitude and HUC methods for entering locations. Relatively few records included the names of estuaries, UTM zones, or general descriptions to specify locations of monitoring activities (Table 4).

**Table 4.** Distribution of frequencies at which respondents chose different methods for entering location data into the inventory questionnaire. Values in bold are the number of records for which the indicated method for entering location data was chosen. Values in parentheses are the proportions of column totals contributed by the location method indicated. Due to rounding, the sum of proportions within a column may not equal 1.0.

Location Method	OR	WA	ID	CA	MT	Total
Contact	<b>138</b> (0.37)	<b>116</b> (0.46)	<b>28</b> (0.47)	<b>1</b> (0.50)	<b>13</b> (0.81)	<b>296</b> (0.41)
Latitude/Longitude	<b>154</b> (0.41)	<b>74</b> (0.29)	<b>22</b> (0.37)	<b>0</b> (0.00)	<b>3</b> (0.19)	<b>253</b> (0.35)
HUC	<b>42</b> (0.11)	<b>32</b> (0.13)	<b>7</b> (0.12)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>81</b> (0.12)
Estuary	<b>19</b> (0.05)	<b>24</b> (0.10)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>43</b> (0.06)
UTM	<b>18</b> (0.05)	<b>1</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>0</b> (0.00)	<b>19</b> (0.03)
General Descriptions	<b>5</b> (0.01)	<b>5</b> (0.02)	<b>3</b> (0.05)	<b>1</b> (0.05)	<b>0</b> (0.00)	<b>14</b> (0.02)
Total	<b>376</b>	<b>252</b>	<b>60</b>	<b>2</b>	<b>16</b>	<b>706</b>

We received location data from approximately 29% of those people contacted (Table 5). Between 5 October and 15 December 2006, we called 78 of the 153 individuals (accounting for 191 of 296 records) provided as contacts for location information. Approximately one-third of those called were unavailable and did not respond to voice messages before the end of this project. Greater than 40% agreed to provide location data, but did not supply the information before this project ended.

**Table 5.** Summary of responses from people listed as contacts in the location section of the PNAMP survey. Totals are from people called by survey personnel, representing approximately one-half of the total number of individuals provided in the survey as contacts for location information. Values in bold are the number of individual contacts (column 2), and the total records contributed by those contacts (column 3) within three response categories. Values in parentheses are the proportions of column totals represented by individual contacts and total records in each response category. Due to rounding, the sum of proportions within a column may not equal 1.0.

Response Category	Individual contacts	Records
Waiting for response	<b>21</b> (0.27)	<b>58</b> (0.30)
Waiting for data	<b>34</b> (0.44)	<b>74</b> (0.40)
Data received	<b>23</b> (0.29)	<b>56</b> (0.29)
Total:	<b>78</b>	<b>191</b>

## Difficulties and Recommendations

During the eighteen week period in which the online survey was available to users and project personnel were actively soliciting responses, 624 people logged into the online survey, and 706 complete records (contributed by 302 respondents) were captured. In the future, longer project duration would allow: 1) expansion of existing contact lists, 2) direct appeals (via telephone) to a larger number of potential respondents, 3) refinement of the survey and output tools based on comments/recommendations from users, and 4) location of other sources of information with which to populated the survey database. Allowing for these and other activities should help increase significantly the volume of information in the survey database, and consequently its utility to users.

In Washington, Oregon, and Idaho we found large geographic areas in which few monitoring activities were reported. Similarly, few descriptions of monitoring were provided for western Montana and northern California. Assuming aquatic monitoring efforts are being conducted, future work should focus specific attention on capturing activities undertaken in these areas, in addition to increasing the volume of records in regions where descriptions of monitoring exist currently. Even where monitoring activities were reported, cursory review of the input suggested that the inventory is not comprehensive.

Although the survey tool was designed to provide several ways for a respondent to input location data (e.g., latitude/longitude, UTM, routed hydro, hydrologic unit, contact information), responses from participants indicate this task in many instances proved onerous, and possibly slowed responses. Monitoring projects may encompass many sampling locations, potentially in disparate areas. Additionally, the survey tool guidance suggested data be formatted in a standard manner before they were input. Respondents may therefore have felt compelled to spend considerable time reformatting data before entering information directly into the survey interface. For future work, options are available allowing a user to avoid having to reformat data, but these eliminate the potential for a completely automated data collection process. For example, a user may copy location data from an existing file, regardless of formatting, and paste them into an appropriate text box in the online survey. These data would require reformatting to meet reporting standards. In light of demands associated with entering location data into the survey interface, and because significant post hoc data manipulation will be required, we recommend the following actions to maximize ease of use and encourage participation:

- 1) retain current options for entering locations;
- 2) provide a tool to upload electronic files (Excel spreadsheet, Microsoft Access database, shape files, etc.); and
- 3) provide an interactive tool allowing users to select the locations of their monitoring activities from a detailed map (data then will be imported into the survey questionnaire in a standard format).

The second recommendation would allow a user to provide data easily and quickly so they are available immediately should subsequent reformatting be required. The third recommendation would permit respondents to enter data easily in a standardized format, but may be unworkable for large geographic areas.

As an alternative to entering locations directly, respondents could provide contact information for a person who could provide location data. We then contacted these individuals to obtain and process the information -- often a time- and labor-intensive process. During this pilot effort, contact information for locations was provided for greater than 40% of the complete records. From 5 October until 15 December 2006, we called approximately one-half of these contacts. The common slow or complete lack of response by those contacted indicates strongly that obtaining location data will prove a difficult and time-consuming task. Because standardized location information is essential for the function of the output tool, and ultimately the utility of the inventory to monitoring practitioners (until location data are received or created and then standardized, specific records will not be accessible to users via the map-based output tool), considerable attention should be paid to this issue in the future. We discovered that obtaining and processing location information can require more time than soliciting participation in the survey.

Across the four states (ID, MT, OR, and WA) focused upon in this pilot project, the “Biological: fish” monitoring type was selected most frequently to classify complete records. To capture the breadth of aquatic monitoring activities conducted throughout the Pacific Northwest, we recommend greater attention be focused on soliciting responses from practitioners conducting aquatic monitoring currently under-represented in the survey database (e.g., “Physical habitat: freshwater wetland, etc.). This type of discriminative search will require greater time on the part of project technicians (i.e., more intensive research prior to contacting potential respondents), but will make output from the inventory relevant to a broader range of users.

Lack of standard delineation within estuarine/coastal regions required unforeseen attention when developing the survey output tool. The primary unit of georeferencing used by the output tool is the fifth-field HUC. Because HUCs define drainage (land) basins, available HUCs do not necessarily encompass points falling in estuaries or along the coast. Existing HUC boundary layers for use in geographic information systems can easily be extended to include estuarine areas; however standard boundaries within the estuaries first must be defined, and overlap between existing HUCs and estuary boundaries reconciled. Until this problem is addressed (i.e., guidance from those working in estuarine areas received), monitoring activities reported in estuarine areas can not be incorporated into the map-based survey output interface.

The survey provides a section for respondents to enter contact information for other relevant practitioners whom we may contact to participate in the survey. While some respondents have referred others by completing this section (73 records), it is evident through correspondence and anecdotal verification that many recipients of the invitational e-mail are forwarding the message to colleagues. Therefore, we recommend that in the future, e-mail messages sent to solicit responses include a sentence requesting we (i.e., the original sender) be “carbon copied” on any invitations that are forwarded to others. This will both increase efficiency and prevent unnecessary multiple contacts with individuals.

The 20% participation rate among people asked to take the survey indicates that additional mechanisms for encouraging participation may be called for. Although undoubtedly a substantial portion of those not responding are people for whom the survey does not apply,



clearly many nonrespondents are indeed in the target audience. Because approximately 1/3 of the survey respondents were from Oregon Department of Fish and Wildlife, we suspect that participation rate for an agency is influenced by factors within each agency. Maximized participation in the future is likely to result from a combination of continued personal contacts as done during this pilot project, and strategic contacts within agencies to encourage participation as agency policy. Over time we also expect participation to increase as interagency cooperation becomes an organic part of monitoring efforts across the region.

We make the following observations and recommendations regarding continuing this effort over the long term:

1. Although some amount of automation can probably be realized for people who are able to provide location information in standard formats, this effort probably can not be automated completely in the foreseeable future. There will remain a need to interpret location information provided and convert it to a standard format for use in the output interface.
2. The long term success of this effort relies on the number of people participating, and on this number growing as quickly as possible. If those who have participated in this survey already do not realize results that benefit themselves, then the impetus for their continued participation is lost, and they will not encourage others to take part. In order to maximize participation in this effort and prevent it from failing due to lack of interest, for one to two more years technicians should be employed to continue the outreach effort begun under this pilot project.
3. Based on the recommendations described in bullets 1 and 2 and our experience from the pilot project, a staff of one technician per state to find and contact participants, plus a project supervisor who will oversee, coordinate, and track the technicians' efforts, would be needed. The project supervisor would also manage and standardize location information for all states. At some point the need for technicians essentially will end. At that time there will still be a continuing need for a single person to oversee the database, manage data standardizations and help with data updates, and direct the occasional computer programming work that will be required. Whether this would require a full time employee can be determined in the future. This person will probably require GIS software and other mapping tools.
4. Occasional programming and GIS assistance will be required, more so in the first than in subsequent years. Funds should be made available for this need.
5. The survey questions and the responses they generated should be reviewed, and the survey modified accordingly before being continued. Additional questions, if any, and ways to add them without prompting confusion among participants, should be determined.

6. The survey input and output interfaces should be reviewed and modified as necessary. The map-based search feature should allow the user to query by geographic areas other than fifth-field HUC. A separate full-text search feature should be added so users can search the survey results via keyword rather than only by the online map interface. If possible, a combination text-based and map-based search should be created.
7. A program should be written which will send participants an email 11.5 months after their latest entry, asking them to review their information and provide any updates necessary. Those who do not respond should be sent another email two weeks later. Those who do not respond for several consecutive years should be sent an additional email, asking for confirmation that their information is still correct. If no response is received their data should be deleted from the database.
8. Because there are other similar efforts currently underway or being planned, this survey should be coordinated to share information with those other efforts, or eventually merged with one or more of those other efforts. However, for at least the next few years the bias should be toward coordination, data sharing, and cross-promotion rather than merging projects. We believe that significant progress and buy-in has been achieved during this short pilot effort. This success should be built upon, expanded, and shared. This effort's continued success in the following years should not depend on the success of other, unproven efforts. Rather, a merger should be considered only with efforts already proven successful for several years and with which data sharing has been accomplished.

## **Conclusions**

Since this project was first implemented, significant progress was made in refining the online questionnaire, creating documentation to advertise the survey, soliciting participation, developing an output tool, and gathering and processing information. However, work is needed to encourage further participation, improve response rate, and ensure that information flows into the inventory easily and efficiently. As the inventory database grows, there will be a need to allocate additional time and resources to managing information (e.g., locations) so data are quickly available to users via the output tool. This should be a principal consideration in the future. If this effort is intended to provide monitoring location information for each year, there will need to be an ongoing level of support to maintain the information and applications, contact respondents, update the information annually, and improve the applications as necessary. While coordination with similar efforts is highly desirable, the long-term success of this project should not be contingent on those other efforts. Mergers with such other efforts, while potentially desirable, should be carefully managed.

## Appendix A: PNAMP questionnaire

### PRELIMINARY INFORMATION

In this survey we ask about aquatic resource monitoring you do. We are interested only in 1) *status and trend* monitoring of aquatic **populations** or **communities**, 2) *status and trend* monitoring of **aquatic habitats**, 3) *status and trend* monitoring of **riparian** and **upland habitats** as they affect aquatic habitats, and 4) *effectiveness* monitoring of habitat improvement projects. Please fill in what you can in a reasonable amount of time.

#### NAME AND CONTACT INFORMATION OF PERSON FILLING OUT THIS SURVEY

\* = required

Last Name\*: \_\_\_\_\_

First Name\*: \_\_\_\_\_

Title\*: \_\_\_\_\_

Agency/Entity\*: \_\_\_\_\_

Office/Subunit: \_\_\_\_\_

Phone\*: \_\_\_\_\_

Email\*: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Address Line 2: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

#### NAME AND CONTACT INFORMATION OF PERSON IN CHARGE OF THE MONITORING WORK (if different than above)

Last Name: \_\_\_\_\_

First Name: \_\_\_\_\_

Title: \_\_\_\_\_

Agency/Entity: \_\_\_\_\_

Office/Subunit: \_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Address Line 2: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

## **OTHER SURVEYS YOU HAVE TAKEN**

Have you already responded to any of the following surveys?

If so, select the survey(s) you have responded to and then proceed to page 36.

Survey of Environmental Monitoring Programs & Associated Databases within Washington

Ecotrust/Wild Salmon Center "North Pacific Salmon Monitoring Data Inventory"  
(State of the Salmon WA, OR, CA, ID ("WOCI") monitoring data inventory)

National Water Quality Monitoring Council (Northwest inventory)

OWEB: Effectiveness Monitoring Workshop Pre-workshop Questions

CSMEP inventory of fish monitoring data sets

## WHAT AND WHERE (Introduction)

You provided the "who" on a previous page. This part is the "where and what."

Because you may conduct more than one type of monitoring, and at more than one location, we will ask you to identify one or more groupings of location / monitoring type combinations. A single grouping can represent any of the following:

- a single location with a single monitoring type
- a single location with multiple monitoring types
- a group of locations with a single monitoring type
- a group of locations with multiple monitoring types

After you have identified all your groupings we will ask for the following optional information about each of them:

- when the monitoring is scheduled to end
- method(s) used
- scope of inference
- cost and funders
- data availability

In general, a grouping representing related monitoring activities -- such as a monitoring project or program or other logical group -- will be most straight-forward. Use however many groupings you feel are needed to characterize your monitoring work.

**GROUPINGS** (This is required)

ADD/EDIT MONITORING TYPE

*MONITORING PROJECT AND PROGRAM NAME(S), IF ANY*

Enter the names of projects, if any, that the monitoring is a part of. Also enter the names of any monitoring programs, if any, that this monitoring is a part of (e.g., AREMP; PIBO aquatic monitoring; TMDL; smolt monitoring program; general parr monitoring; etc.).

---

---

---

---

---

---

---

---

---

---

*MONITORING TYPE* (select one of the following)

- WATER QUANTITY
- WATER QUALITY
- SOIL AND SEDIMENT QUALITY
- PHYSICAL HABITAT: ESTUARINE
- PHYSICAL HABITAT: FRESHWATER WETLAND
- PHYSICAL HABITAT: IN-STREAM
- PHYSICAL HABITAT: LAKE/POND/RESERVOIR
- PHYSICAL HABITAT: RIPARIAN
- PHYSICAL HABITAT: UPLAND
- BIOLOGICAL: VEGETATION
- BIOLOGICAL: MACROINVERTEBRATES
- BIOLOGICAL: FISH
- BIOLOGICAL: AMPHIBIANS/REPTILES
- BIOLOGICAL: BIRDS
- BIOLOGICAL: MAMMALS
- BIOLOGICAL: OTHER
- OTHER

*SAMPLING FREQUENCY* (select any of the following; you may select multiple frequencies)

- UNKNOWN
- MULTI-YEAR ROTATING PANEL
- ANNUALLY OR LONGER
- QUARTERLY
- MONTHLY
- WEEKLY
- DAILY
- MORE THAN DAILY

*EFFECTIVENESS MONITORING*

Is the indicated monitoring explicitly intended to evaluate the effectiveness of specific habitat improvement projects, policies, or regulatory actions?

If yes, please identify the action(s) being evaluated (e.g., name of a policy, "flow augmentation," "barrier removal," "riparian enhancement," etc.).

Select any of the following (you may select multiple categories)

- FISH SCREENING
  - Examples:*
  - Fish Screen
  - Fish Screen Replaced
  
- FISH PASSAGE
  - Examples:*
  - Fish Ladder Improved
  - Fish Ladder Installed
  - Fishways (ladders, chutes, or pools)
  - Barriers (dams or log jams)
  - Diversion Dam/push up dam removal
  - Road Crossings (bridges or culverts)
  - Culvert Improvements/Upgrades
  - Culvert Installation
  - Culvert Replacement
  - Culvert Removal
  - Weirs (log or rock)
  
- INSTREAM FLOW
  - Examples:*
  - Water leased or purchased
  - Irrigation practice improvement
  - Water flow returned to stream



— INSTREAM

*Examples:*

Streambank Stabilization  
Channel Connectivity  
Channel reconfiguration (includes channel roughening)  
Deflectors/barbs  
Log (control) weirs  
Off channel habitat  
Plant removal/control  
Rock (control) weir  
Signage  
Site Maintenance  
Spawning Gravel Placement  
Large Woody Debris  
Stream Channels  
Boulders  
Rootwads  
Structure/Log Jam  
Beaver Introduction

— INSTREAM WETLAND

*Examples:*

Wetland Creation  
Wetland Improvement/Enhancement  
Wetland Restoration  
Wetland Vegetation Planting  
Wetland Invasive Species Removal

— RIPARIAN

*Examples:*

Livestock Water Development  
Water Gap Development  
Fencing  
Forestry Practices/Stand Management  
Planting  
Livestock Exclusion  
Conservation Grazing Management  
Weed Control

— SEDIMENT REDUCTION

*Examples:*

Road Reconstruction  
Road Relocation  
Road Stream Crossing Improvements (=Rocked Ford)  
Road Drainage System Improvements  
Road Obliteration  
Erosion Control Structures  
Sediment Traps  
Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)

— UPLAND AGRICULTURE

*Examples:*

Livestock Management  
Agriculture Management (BMPs)  
Fencing  
Water Development

— UPLAND-VEGETATION

*Examples:*

Planting  
Invasive Plant Control  
Vegetation/Stand Management  
Slope Stabilization

— UPLAND-WETLAND

*Examples:*

Wetland Creation  
Wetland Improvement/Enhancement  
Wetland Restoration  
Wetland Vegetation Planting  
Wetland Invasive Species Removal

— WATER QUALITY IMPROVEMENT

*Examples:*

Return Flow Cooling  
Refuse Removal  
Toxic Clean-up

\_\_\_ OUTMIGRANT SURVIVAL IMPROVEMENT (Estuary)

*Examples:*

Invasive Species Treated  
Creation of new estuarine area  
Removal of existing fill material  
Channel Modification  
Increased Freshwater Flow  
Dike Breaching/Removal  
Tidegate Alteration/Removal  
Dike Reconfiguration

\_\_\_ LAND PROTECTED, ACQUIRED, OR LEASED

*Examples:*

Streambank Protected  
Wetland or Estuarine are Protected

\_\_\_ NUTRIENT ENRICHMENT

*Examples:*

Fertilizer  
Carcass Analog  
Carcass Placement

\_\_\_ OTHER

*MONITORING INDICATORS*

Check any of the indicators associated with the monitoring type selected on page 6 (you may select multiple indicators; if “other” please specify in the space provided)

WATER QUANTITY

- Flow volume/timing
- Flow diversion/timing
- Ground water/water table
- Other (please specify: \_\_\_\_\_)

WATER QUALITY

- Temperature
- Conductivity
- Turbidity
- Suspended sediment
- Suspended solids
- Light absorption/scattering
- Dissolved oxygen
- pH
- Alkalinity
- Salinity
- BOD
- Nutrients
- Contaminants
- Pesticides
- Herbicides
- Pharmaceuticals
- PBDEs
- PCBs
- Dioxins
- Heavy metals
- Major ions
- Algae/chlorophyll
- Fecal coliforms
- Macroinvertebrates
- Other (please specify: \_\_\_\_\_)

SOIL AND SEDIMENT QUALITY

- Salinity
- Moisture content
- Erosion
- Other (please specify: \_\_\_\_\_)

PHYSICAL HABITAT: ESTUARINE

- Air temperature
- Armoring
- Turbidity
- Channelization
- Culverts
- Dams
- Depth
- Dikes
- Elevation
- Emergent vegetation
- Flood plain width
- Large wood count
- Salinity
- Soil salinity
- Species composition
- Substrate type
- Tidal range
- Tributaries
- Vegetation type
- Other (please specify: \_\_\_\_\_)

PHYSICAL HABITAT: FRESHWATER WETLAND

- Species composition
- Substrate type
- Vegetation type
- Other (please specify: \_\_\_\_\_)

PHYSICAL HABITAT: IN-STREAM

- Thalweg profile
- Thalweg depth
- Wetted width
- Bankfull width
- Habitat class
- Large woody debris
- Slope and bearing
- Bank angle
- Bank incision
- Bank undercut
- Bankfull height
- Canopy cover
- Cover
- Substrate
- Channel type
- Habitat unit types
- Other (please specify: \_\_\_\_\_)

PHYSICAL HABITAT: LAKE/POND/RESERVOIR

- Depth
- Substrate type
- Other (please specify: \_\_\_\_\_)

PHYSICAL HABITAT: RIPARIAN

- Substrate type
- Elevation
- Canopy cover
- Riparian vegetation structure
- Air temperature
- Other (please specify: \_\_\_\_\_)

PHYSICAL HABITAT: UPLAND

- Area
- Perimeter
- Stream layer
- Elevation
- Equivalent clearcut area
- Impervious surfaces
- Road density
- Land cover
- Land use
- Substrate type
- Riparian zone
- Other (please specify: \_\_\_\_\_)

BIOLOGICAL: VEGETATION

- Species composition
- Species diversity
- Nonnative/invasive species
- Canopy cover
- Riparian vegetation structure
- Other (please specify: \_\_\_\_\_)

BIOLOGICAL: MACROINVERTEBRATES

- Species composition
- Species diversity
- Species distribution
- EPT
- Nonnative/invasive species
- Other (please specify: \_\_\_\_\_)

## BIOLOGICAL: FISH

- Adult age at return
- Adult passage timing
- Adults/redd
- Age structure
- Allelic richness (rarefaction)
- Ascendency
- Carcass disease
- Carcass count
- Carcass distribution
- Carcass length at age
- Cost per adult harvested
- CPUE
- Dam counts
- Dam passage mortality
- Diversity
- Effective number of breeders
- Emigration size
- Emigration timing
- Escapement
- Fecundity
- Female spawner abundance
- Gonadal somatic index (GSI)
- Growth rates
- Harvest effect
- Harvest in-river
- Harvest-ocean
- Heterozygosity
- H-W success
- Juvenile abundance
- Juvenile distribution
- Juvenile size
- Length/frequency distribution
- Male: female ratio
- Number of natural residuals
- Number of redds
- Parr to smolt survival
- Phenotypic data
- Piscovory index
- Presence/absence
- Pre-spawning mortality
- Recruits per spawner
- Redd distribution
- Relative reproductive success
- Run timing (adults)

- Sex ratio
- Smolt abundance
- Smolt distribution
- Smolt health
- Smolt passage timing
- Smolt size
- Smolt to adult return rate (SAR)
- Smolts/adult
- Smolts/female
- Smolts/redd
- Spawner distribution
- Stock identification
- Stray rate
- Total catch of each stock in fishery
- Total spawner abundance
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: AMPHIBIANS/REPTILES**

- Species composition
- Species diversity
- Species distribution
- Nonnative/invasive species
- Mortality
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: BIRDS**

- Species composition
- Species diversity
- Species distribution
- Nonnative/invasive species
- Mortality
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: MAMMALS**

- Species composition
- Species diversity
- Species distribution
- Nonnative/invasive species
- Mortality
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: OTHER**

please specify: \_\_\_\_\_

**OTHER**

please specify: \_\_\_\_\_



*SPECIES MONITORED*

Check any of the taxa or groups associated with the monitoring type selected on page 6 (you may select multiple indicators; if “other” please specify in the space provided)

BIOLOGICAL: VEGETATION

- Invasive species
- Estuarine plants
- Tidal estuarine marsh plants
- Tidal freshwater marsh plants
- Freshwater wetland plants
- Freshwater aquatic plants
- Riparian plants
- Upland plants
- Ferns and horsetails
- Grasses
- Sedges
- Other monocots
- Trees and shrubs
- Dicot herbs
- Algae
- Ulva spp.
- Enteromorpha spp.
- Grassilaria spp.
- Giant kelp (*Macrocystis pyrifera*)
- Smooth/saltmarsh/Atlantic cordgrass (*Spartina alterniflora*)
- Alkali cordgrass (*Spartina gracilis*)
- Prairie cordgrass (*Spartina pectinata*)
- Townsend's cordgrass (*Spartina X townsendii*)
- Reed canary grass (*Phalaris arundinacea*)
- American eelgrass (*Vallisneria americana*)
- Eelgrass / seawrack (*Zostera marina*)
- Japanese/dwarf eelgrass (*Zostera/Nanozostera japonica/nana*)
- Japanese knotweed (*Polygonum cuspidatum*)
- Virginia glasswort (*Salicornia virginica*)
- Purple loosestrife (*Lythrum salicaria*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Other (please specify: \_\_\_\_\_)

BIOLOGICAL: MACROINVERTEBRATES

- Mussels / clams (Bivalvia)
- Snails (Gastropoda)
- New Zealand mud snail (*Potamopyrgus antipodarum*)
- European green crab (*Carcinus maenas*)
- Mitten crab (*Eriocheir sinensis*)
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: FISH**

*Please provide a species list in the space provided below*

---

---

---

---

---

---

---

---

**BIOLOGICAL: AMPHIBIANS/REPTILES**

- Pacific giant salamander (*Dicamptodon tenebrosus*)
- Tailed frog (*Ascaphus sp.*)
- Bullfrog (*Rana catesbeiana*)
- Western pond turtle (*Clemmys marmorata*)
- Common slider (turtle) (*Trachemys scripta*)
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: BIRDS**

*Please provide a species list in the space provided below*

---

---

---

---

---

---

---

---

**BIOLOGICAL: MAMMALS**

- Beaver (*Castor canadensis*)
- Mountain beaver (*Aplodontia rufa*)
- Muskrat (*Ondatra zibethicus*)
- Nutria (*Myocastor coypus*)
- River otter (*Lontra canadensis*)
- California sea lion (*Zalophus californianus*)
- Steller sea lion (*Eumetopias jubatus*)
- Harbor seal (*Phoca vitulina*)
- Other (please specify: \_\_\_\_\_)

**BIOLOGICAL: OTHER**

*Please provide a species list in the space provided below*

---

---

---

---

---

---

---

---



What is the datum for these lat/longs? (Examples: WGS84, NAD83, 91 Adj., NAD27, HARN, unknown)

---

---

---

Method used to determine lat/long (please check one of the following)

- GPS (Differentially corrected)
- GPS (No differential correction)
- GPS (Unknown if corrected)
- Digitized - computer screen (heads-up)
- Digitized - paper map (digitizer pad)
- Hand measured - paper map (interpolation)
- Estimated Value
- Multiple methods
- Other



ESTUARIES (less preferred)

*Please check the estuaries where your monitoring is conducted*

PUGET SOUND

- Strait of Juan de Fuca
- San Juan Archipelago
- Widbey Basin and Admiralty Inlet (North Puget Sound)
- Central Puget Sound
- Hood Canal
- South Puget Sound

- Sixes River
- Elk River
- Euchre Creek
- Rogue River
- Pistol River
- Chetco River
- Winchuck River

WASHINGTON COAST

- Sooes River
- Ozette River
- Soleduck River
- Hoh River
- Queets River
- Quinault River
- Grays Harbor
- Willipa Bay

- Columbia River

OREGON COAST

- Necanicum River
- Nehalem River
- Tillamook Bay
- Netarts Bay
- Sand Lake
- Nestucca Bay
- Salmon River
- Siletz Bay
- Depoe Bay
- Yaquina Bay
- Beaver Creek
- Alsea Bay
- Siuslaw River
- Siltcoos River
- Umpqua River
- Ten Mile Lake
- Coos Bay
- Coquille River
- Two Mile Creek
- New River

CALIFORNIA

- Smith River
- Elk Creek
- Nickle Creek
- Klamath River
- Redwood Creek
- Little River
- Humboldt Bay
- Eel River
- Bear River
- Mattole River
- Ten Mile River
- Pudding Creek
- Noyo River
- Big River
- Little River
- Albion River
- Whitesboro Cove (Little & Big Salmon Creeks)
- Navarro River
- Garcia River
- Gualala River
- Russian River
- Bodega Harbor
- Estero Americano
- Estero San Antonio
- Tomales Bay
- Drakes Estero
- Estero de Limantour
- Bolinas Lagoon
- San Francisco Bay





## CONTACT PERSON

Provide contact information for the person who will provide locations.

Last name: \_\_\_\_\_

First name: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_



Method used to determine lat/long (please check one of the following)

- GPS (Differentially corrected)
- GPS (No differential correction)
- GPS (Unknown if corrected)
- Digitized - computer screen (heads-up)
- Digitized - paper map (digitizer pad)
- Hand measured - paper map (interpolation)
- Estimated Value
- Multiple methods
- Other





## CONTACT PERSON

Provide contact information for the person who will provide locations.

Last name: \_\_\_\_\_

First name: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_



Method used to determine lat/long (please check one of the following)

- GPS (Differentially corrected)
- GPS (No differential correction)
- GPS (Unknown if corrected)
- Digitized - computer screen (heads-up)
- Digitized - paper map (digitizer pad)
- Hand measured - paper map (interpolation)
- Estimated Value
- Multiple methods
- Other





## CONTACT PERSON

Provide contact information for the person who will provide locations.

Last name: \_\_\_\_\_

First name: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

**OTHER PEOPLE DOING MONITORING**

Can you suggest other people involved in aquatic resource monitoring to take this survey? Please provide names and contact information (phone or email or mailing address) below.

\* = required

Last Name\*: \_\_\_\_\_

First Name\*: \_\_\_\_\_

Title: \_\_\_\_\_

Agency/Entity: \_\_\_\_\_

Office/Subunit: \_\_\_\_\_

Phone\*: \_\_\_\_\_

Email: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Address Line 2: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Types of monitoring done:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Notes:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







FUNDING

Please check any funding entities that apply

- BPA
- NMFS
- USFS
- BLM
- SRFB
- OWEB
- USFWS
- USACOE
- US BOR
- EPA
- Other (please specify: \_\_\_\_\_)

PROJECT NUMBER (if any; Contract number, funder's project number, etc)

---

DATA AVAILABILITY

Are you willing to share these data with other monitoring practitioners? If so, complete the following

*DATA STORAGE FORMAT* (check all that apply)

- Paper hard copy
- Electronic document (e.g., PDF file, MS word file)
- Database software (e.g., MS Access, Oracle)
- GIS (e.g., shape files, layers, geodatabase)
- Internet site (provide URL)

*HOW CAN PEOPLE OBTAIN THE DATA?*

Provide a contact person or an Internet site. If the contact information is the same as for the person filling out this survey, you can enter "Same" for the last name and leave the rest blank.

Last Name: \_\_\_\_\_

First Name: \_\_\_\_\_

Title: \_\_\_\_\_

Agency/Entity: \_\_\_\_\_

Office/Subunit: \_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Internet address (URL): \_\_\_\_\_



## Appendix B: definitions

Logged-in only - Respondent logged-in to the survey (using his/her e-mail address), but entered no further information

Complete Records - Respondent entered **core/essential** information including:

- contact information
  - i. e-mail address
  - ii. first name
  - iii. last name
  - iv. phone number
  - v. etc.
- monitoring information
  - i. monitoring type
  - ii. indicators/parameters
  - iii. location data
  - iv. etc.

Secondary information - **Non-required** information including:

- beginning and ending years
- descriptions of protocols
- scope of inference
- cost
- data availability and format(s)
- partners
- funding sources (and associated information; e.g., project numbers)
- other contacts (contact information for other practitioners to contact)

Completed previous survey – Respondent indicated he or she completed one of the following surveys. By selecting one of these surveys, the user bypassed forms asking for core/essential and secondary information; the user was asked to refer other practitioners, and the user was counted as having completed the survey. The surveys presented were:

- Ecotrust's State of the Salmon WA, OR, CA, ID ("WOCI") monitoring data inventory
- Survey of Environmental Monitoring Programs & Associated Databases Within Washington
- OWEB Effectiveness Monitoring Workshop Pre-workshop Questions
- CSMEP inventory of fish monitoring data sets