

PUGET SOUND COORDINATED ECOSYSTEM MONITORING AND ASSESSMENT PROGRAM

CHARTER

TABLE OF CONTENTS

Problem Statement	1
Purpose	3
Background	4
Goals	6
Roles, Responsibilities and Relationships	8
Data Management and Access	13
Reporting and Communication	15
Peer Review	16
Quality Assurance/Quality Control (QA/QC)	17
Funding	17
Glossary	18
References	21
Appendix 1	23

Introduction

This charter establishes the basic framework for a coordinated ecosystem monitoring and assessment program that is intended to serve the needs of the Puget Sound Partnership and the many organizations and entities across the Puget Sound basin that are committed to helping the Partnership - through their individual and collective actions - achieve the goal of restoring and protecting the health of Puget Sound.

The charter outlines a collaborative, inclusive, and transparent approach to monitoring and assessment that would build upon the many individual and local monitoring programs already in existence. In so doing, the charter recognizes that our collective goals for restoring and protecting Puget Sound will require a deliberate effort to coordinate these programs to address regional and ecosystem needs in a way that has rarely been done before. By necessity, this charter represents a starting point – it is anticipated and expected that elements of the monitoring and assessment program will need to develop and evolve over time, and that the various organizational components of the monitoring and assessment program must remain correspondingly flexible and responsive.

Problem Statement

In 2007, the Washington Legislature (RCW 90.71.200) found that:

“(a) Puget Sound, including Hood Canal, and the waters that flow to it are a national treasure and a unique resource. Residents enjoy a way of life centered

1 around these waters that depends upon clean and healthy marine and freshwater
2 resources.”

3 “(b) Puget Sound is in serious decline, and Hood Canal is in a serious crisis.
4 This decline is indicated by loss of and damage to critical habit, rapid decline in
5 species populations, increases in aquatic nuisance species, numerous toxics
6 contaminated sites, urbanization and attendant storm water drainage, closure of
7 beaches to shellfish harvest due to disease risks, low-dissolved oxygen levels
8 causing death of marine life, and other phenomena. If left unchecked, these
9 conditions will worsen.”

10 “(c) Puget Sound must be restored and protected in a more coherent and
11 effective manner. The current system is highly fragmented. Immediate and
12 concerted action is necessary by all levels of government working with the public,
13 nongovernmental organizations, and the private sector to ensure a thriving natural
14 system that exists in harmony with a vibrant economy.”

15 Under the same authority, the legislature created the Puget Sound Partnership with the
16 goal of restoring Puget Sound to health by 2020, and authorized the implementation and
17 coordination of a Puget Sound assessment and monitoring program to support that effort.

18
19 Many well-designed and executed monitoring programs currently operate throughout the
20 Puget Sound region. While they collectively represent a significant monitoring effort,
21 almost all of these programs were designed to satisfy individual agency mandates (e.g.
22 specific permit requirements) or are primarily intended to support local management
23 decisions (e.g. closing beaches for public health reasons). Further complicating the
24 issue, different agencies have met their requirements in different ways, over different
25 periods of time, and at different funding levels. With little or no coordination occurring,
26 the result is (at best) a fragmented regional monitoring program and a non-uniform
27 understanding of the Puget Sound ecosystem as a whole (PSP Strategic Science Plan
28 2010).

29
30 This un-coordinated approach to monitoring and assessment is generally inefficient (there
31 may be occasional duplication of effort – along with significant data gaps, incompatible
32 protocols and data management systems, and other impediments to sharing or combining
33 important datasets). This often translates into collectively higher costs (e.g. when basic
34 monitoring plans, data management systems, reports, protocols, quality assurance plans,
35 and similar fundamentals are re-created multiple times by numerous individual
36 monitoring entities). And when basic monitoring designs, protocols, and data
37 management systems are not coordinated, it greatly increases the difficulty (and expense)
38 of rolling-up information at the regional (or even watershed) scale.

1
2 The importance of rolling-up and combining environmental data (and assessments) across
3 multiple geographic and political scales is greater now than ever before. With the
4 adoption of the Partnership’s Action Agenda, and the state’s regional approach to salmon
5 recovery, there is a critical need for relevant, timely, reliable information that can feed
6 into key regional and local decision-making and “adaptive management” processes. To
7 the extent that current monitoring programs are often incompatible and frequently “stove-
8 piped” (isolated by entity or topic area) it impedes our ability to support a regional,
9 ecosystem-based conservation and management strategy. To successfully restore Puget
10 Sound, we need a coordinated, regional monitoring and assessment program that can
11 determine the status (and trends) of key ecosystem indicators and measures, determine
12 the effectiveness of our management actions, understand whether or not (and how) those
13 actions truly improve ecosystem health, and continue to track compliance with
14 established standards, rules, and requirements.
15

16 ***Purpose***

17 The purpose of the Puget Sound Coordinated Ecosystem Monitoring and Assessment
18 Program is to support the goals of the Puget Sound Partnership and the many
19 organizations and entities at all levels committed to helping the Partnership.
20

21 The state’s goals to restore and protect Puget Sound are ambitious (RCW 90.71.300) and
22 will require an effective and efficient monitoring and assessment program. The
23 monitoring and assessment program is intended to facilitate and coordinate the work of
24 existing and future monitoring and assessment efforts, and must be able to describe the
25 status of the ecosystem, assess the effectiveness of our restoration and protection actions,
26 evaluate progress towards ecosystem recovery, and support adaptive management
27 processes and decision-making at many scales.
28

29 To be successful, the monitoring and assessment program must meet local and agency-
30 specific mandates while efficiently addressing regional and ecosystem-scale questions
31 and meeting the goals of the Action Agenda. The monitoring and assessment program
32 must provide easily accessible and objective information, and ensure the production,
33 synthesis, and integration of results and communicate findings transparently and
34 effectively to the public.
35

36 The monitoring and assessment program will inform policy choices, balance needs
37 among ecosystem components, address issues of geospatial scale, facilitate coordination
38 among existing monitoring and assessment efforts, and incorporate high standards for
39 experimental design, statistical power, and support for indicator tracking. Monitoring
40 must be designed with different uses in mind, such as status and trends, and effectiveness

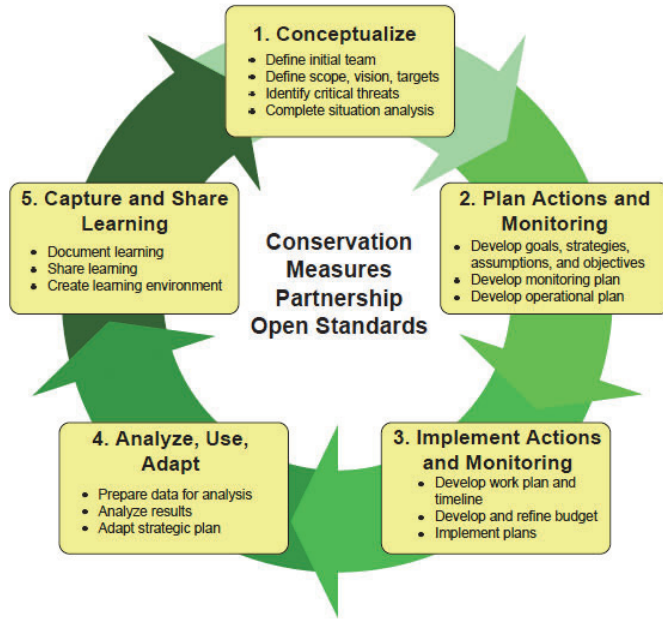
1 of restoration and protection actions. The program must also closely coordinate with
2 research and modeling efforts so that monitoring strategies use the best technologies
3 available for accurate assessments, and so monitoring supports (and is guided by)
4 modeling efforts (Strategic Science Plan 2010)
5

6 ***Background***

7 Natural and social science information has given us a base understanding of how Puget
8 Sound and its surrounding watersheds and communities work as a system. From this
9 understanding, we have generated hypotheses about the state of Puget Sound and the
10 actions needed to restore the system to a healthy, self-sustaining condition. In response,
11 diverse actions, as compiled in the Action Agenda, are being implemented to achieve
12 recovery.
13

14 Achieving a healthy Puget Sound requires a dynamic and transparent interface between
15 structured information and the actions of many individuals and entities. Monitoring,
16 coupled with the assessment of the monitoring results, are necessary means by which to
17 obtain the structured information needed to evaluate the effectiveness of the investments
18 for restoring the health of Puget Sound, inform ecosystem recovery and adapt
19 management activities over time.
20

21 The Puget Sound Partnership has adopted an adaptive management approach to improve
22 recovery actions over time. Adaptive management is defined in RCW 77.85.010 as the
23 “Reliance on scientific methods to test the results of actions taken so that the
24 management and related policy can be changed promptly and appropriately”. As stated in
25 the Puget Sound Partnership Strategic Science Plan, “adaptive management allows
26 ecosystem recovery efforts to move forward in the face of uncertainty by ensuring that
27 actions are evaluated against goals and where necessary, altered to optimize outcomes”.
28 The Science Panel endorsed an adaptive management approach, and PSP adopted the use
29 of the Open Standards for the Practice of Conservation (Conservation Measures
30 Partnership, 2007) as the framework for implementing the adaptive management cycle
31 (Puget Sound Partnership 2010; Fig. 1). Planning and implementation of monitoring is a
32 critical step in the adaptive management cycle (Conservation Measures Partnership 2007;
33 Fig. 1). Therefore, a well-designed monitoring and assessment program informs and
34 responds to policy decisions, management actions and scientific needs such that
35 individual choices and management, policy and scientific decisions improve over time,
36 ultimately leading to ecosystem recovery.



1
2 **Fig. 1 Adaptive management cycle as described in the Open Standards for the**
3 **Practice of Conservation (Conservation Measures Partnership 2007).**

4
5 A variety of monitoring and assessment programs already exist in the Puget Sound
6 region. The Monitoring Program must build on existing efforts to improve monitoring of
7 the health of Puget Sound and recovery efforts. In 2007, the Washington State
8 Legislature recognized the need for a coordinated and integrated monitoring program to
9 inform Puget Sound recovery efforts. The Legislature allocated resources to the
10 Department of Ecology to begin the discussion on creating such a program, which led to
11 the creation of the Monitoring Consortium and recommendations to the Legislature in
12 2008 on governance (Monitoring Consortium 2008).

13
14 In addition, the 2010 Puget Sound Partnership’s Strategic Science Plan recognizes the
15 importance of a coordinated and integrated monitoring program by stating:

16
17 “ ...Although it requires long-term stable funding to achieve, without monitoring,
18 there can be no performance accountability, and the opportunities to make
19 improvements in ecosystem recovery are constrained. Because of its critical
20 importance, the Partnership will develop and implement a coordinated regional
21 monitoring program....”

22
23 The Puget Sound Assessment and Monitoring Program (PSAMP) is a foundational
24 monitoring program in Puget Sound that has improved communication among agency
25 and academic organizations and increased coordination of monitoring. PSAMP is an
26 interagency partnership formed in 1988 to assess the condition of Puget Sound and its

1 resources. Although PSAMP has been successful in assessing the cumulative outcome of
2 collective management actions and has been reporting baseline information on various
3 indicators of the health of Puget Sound, areas for improvement have been identified such
4 as conducting effectiveness monitoring and strengthening ties to specific management
5 questions and key external entities and processes (Puget Sound Assessment and
6 Monitoring Program Steering Committee and Management Committee 2008). PSAMP
7 and other monitoring at all levels of government, tribes, business, academia and citizen-
8 science organizations exist throughout the Puget Sound region and should be considered
9 as building blocks for a coordinated and integrated monitoring and assessment program
10 (e.g., the Stormwater Work Group, the Puget Sound Salmon Recovery Monitoring and
11 Adaptive Management Program and others).

12
13 The Puget Sound Partnership is charged with developing and implementing “a
14 coordinated regional program for monitoring ecosystem status and trends, program and
15 project effectiveness, and cause-and-effect relationships.” (Action Agenda Near-Term
16 Action E.3.2). The Puget Sound Partnership is also mandated to develop a performance
17 management system “to improve accountability for ecosystem outcomes, on-the-ground
18 results, and implementation of actions.” Therefore, a variety of monitoring results will be
19 integrated in the Performance Management System at the Puget Sound Partnership.

20 21 ***Goals***

- 22 **1. Work in a collaborative, transparent fashion with all monitoring partners to**
23 **improve monitoring efficiency and effectiveness for all participants, and to**
24 **better coordinate and integrate monitoring programs (existing and new)**
25 **across Puget Sound and the rest of the Salish Sea.**
 - 26 a. Strategically build on existing monitoring efforts currently implemented by
27 various levels of government, tribes, business, academia and citizen-science
28 organizations throughout the Puget Sound region to achieve our goals.
 - 29 b. Ensure that monitoring results contribute to local, watershed, regional (Puget
30 Sound), statewide, Pacific Northwest, and national assessments to the extent
31 possible.
 - 32 c. Build consensus on who should monitor what, when, and where (and how)
33 and provide recommendations for determining the highest monitoring
34 priorities.
 - 35 d. Ensure coordination and cross-topic synthesis of monitoring conducted in
36 support of existing management actions and policies, such as the Clean Water
37 Act, Endangered Species Act, Shoreline Management Act and Growth
38 Management Act.

- 1 **2. Ensure monitoring and assessment of key indicators in Puget Sound as**
2 **critical elements of decision-making through adaptive management.**
 - 3 a. Ensure data collection, analysis, management and reporting of priority
4 indicators for ecosystem, human health and well-being, programmatic
5 components, threat reduction and strategy effectiveness.
 - 6 b. Develop monitoring and assessments necessary to evaluate whether the
7 recovery actions, as prescribed in the Action Agenda, are meeting the six
8 recovery goals stated in RCW 90.71 (water quality, water quantity, species
9 and food webs, habitats, human health and well being).
 - 10 c. Establish new and assess existing monitoring to determine the effectiveness of
11 recovery actions, evaluate progress towards ecosystem recovery and inform
12 decision-making through adaptive management to achieve the goals of the
13 Action Agenda.
 - 14 d. Ensure linkages between implementation, compliance, effectiveness and
15 status/trends monitoring.
- 16 **3. Ensure data are credible, trusted, and available with known precision,**
17 **accuracy, and certainty.**
 - 18 a. Increase accessibility to data and improve coordination of data collection, data
19 management, analysis and reporting among monitoring entities to reduce
20 duplication of effort, while recognizing individual monitoring requirements
21 and mandates.
 - 22 b. Promote development and implementation of standardized protocols and
23 methodologies to better integrate data across various scales, participants, and
24 geographic regions.
 - 25 c. Implement a credible and appropriate QA/QC and Peer Review program to
26 help guide monitoring designs, implementation, and reporting.
- 27
28 **4. Ensure findings are easily discoverable, available, and communicated to a**
29 **broad audience including the scientific, management and policy**
30 **communities, decision-makers, tribes and the public.**
 - 31 a. Compile, synthesize and communicate monitoring and assessment findings
32 that interpret the data in an unbiased fashion (“tell the story”) about Puget
33 Sound including the funding needed to conduct the ongoing monitoring.
 - 34 b. Ensure that results and findings from the monitoring program are reported in
35 the State of the Sound report and used as a basis for updating the Puget Sound
36 Partnership Biennial Science Work Plan and Action Agenda.
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Roles, Responsibilities and Relationships

Program Structure

The monitoring and assessment program envisioned in this Charter will comprise a set of topic-specific and cross-topic work groups, directed by an independent Steering Committee. The Steering Committee is the primary decision-making body for the monitoring and assessment program and will develop recommendations for monitoring entities and the Partnership with regard to the coordination and implementation of the regional monitoring and assessment program.

Several advisory or support groups that are already established will provide recommendations and feedback to the Steering Committee (including the Science Panel, Ecosystem Coordination Board, and Leadership Council). PSP staff will provide support to the Steering Committee and work groups. Some work groups are expected to be permanent. Other work-groups may be formed to work on specific questions or integration issues as directed by the Steering Committee. The participation of various programs housed at monitoring entities is also anticipated.

The Monitoring Program structure engages multiple partners and stakeholders at technical, scientific and policy levels within a fairly simple decision-making structure (Fig. 2). The Monitoring Program is overseen by the Steering Committee. The Steering Committee informs, and in return receives guidance and recommendations from, the Science Panel (especially) as well as the ecosystem coordination board and ultimately the leadership council. Technical information, monitoring results, insight on local capacity and requirements, and implementation advice flows up from the Work Groups for discussion with the Steering Committee. Puget Sound Partnership staff support the Steering Committee and work groups, as well as the other advisory bodies.



1
2

3 **Fig. 2. Structure of the Puget Sound Coordinated Ecosystem Monitoring and**
4 **Assessment Program depicting the program components and their relationships.**

5
6

7 The descriptions below summarize the general roles and composition of each program
8 component. For a more detailed description of the roles and responsibilities of each
9 program component recommended by the Launch Committee, please see Appendix 1.

10 ***Summary of Roles for the Program Components***

11

12 **Steering Committee**

13

14 **Role:** The Steering Committee is the primary decision-making body that will oversee and
15 guide the development and implementation of the regional Monitoring Program. The
16 Steering Committee will provide direction to the Work Groups especially with regard to
17 regional information needs, questions, and priorities for monitoring and assessment. It is
18 ultimately accountable for decisions affecting the regional monitoring and assessment
19 program. The Steering Committee will identify and commission the Work Groups and
20 ensure coordination of Work Group activities and integration across topics (some work

1 groups are expected to be permanent, while others may be convened for a limited
2 duration in order to address a particular cross-topic question or topic of interest).

3
4 In making its decisions and recommendations, the Steering Committee will seek and
5 consider input from the Science Panel (especially) and Ecosystem Coordination Board, as
6 well as from the Work Groups. The Steering Committee may direct and approve
7 monitoring and assessment work plans, propose monitoring plan changes, approve
8 quality assurance plans, direct or coordinate data synthesis and inter-disciplinary
9 approaches, integrate information and recommendations from the workgroups,
10 commission or recommend data analyses and assessment, and direct other strategic or
11 technical work as needed and appropriate. The Steering Committee may review and
12 recommend funding needs and priorities to support the regional monitoring and
13 assessment program, and lead or assist in the development of a regional monitoring and
14 assessment funding strategy.

15
16 The Steering Committee will approve and adopt this charter, including any bylaws,
17 revisions, or updates as/when needed.

18
19 **Composition:** The Steering Committee includes at least these entities: state agencies;
20 federal agencies; local governments; tribes; environmental organizations; businesses; and
21 research institutions. The representatives on the Steering Committee are people with
22 scientific and environmental policy backgrounds and practical experience in specific
23 topic areas. In general, it is anticipated that the Steering Committee will be representative
24 of the monitoring entities comprising the technical Work Groups (but may include other
25 interested organizations as well). The Puget Sound Partnership will provide staff support
26 for the Steering Committee to facilitate and assist its initiatives and efforts. However, the
27 decision-making authority for the coordinated monitoring program will reside with the
28 Committee.

29 30 **Work Groups**

31
32 **Role:** The Work Groups are a key element of the Program and provide the primary venue
33 (forum) to assemble the many entities from across Puget Sound that are responsible for
34 and involved with monitoring particular media, topics, or ecosystem
35 components/attributes. Through collaboration, and with support from PSP staff and
36 others, the work groups are primarily charged with coordinating their collective
37 monitoring efforts to:

- 38 1. maximize the overall efficiency and effectiveness of monitoring across the Sound
- 39 2. support the participating organizations' individual and independent needs for
40 monitoring, and

- 1 3. plan for and contribute to meeting the larger regional information needs of the
2 Partnership, state and federal action agencies, and others.

3 The Work Groups will serve as the expert (technical) forums necessary to evaluate and
4 recommend monitoring for their specific topics including where (and how) data should be
5 collected, managed, and assessed. They will help develop monitoring questions and
6 hypotheses within topics, and will contribute data assessments, technical analyses
7 (including capacity requirements), and other support in response to Steering Committee
8 (or Science Panel) recommendations and guidance. Work Groups will also be key in
9 assuring that the necessary data and assessments exist to track the success (and provide
10 accountability for) the Puget Sound ecosystem recovery effort.

11
12 Work Groups members will be asked to contribute data and assessments that can be
13 rolled-up at the regional scale and used for the Partnership’s dashboard indicators and/or
14 to address requirements of the Action Agenda, while being cognizant of the continuing
15 need to support the individual mandates and independent authorities of the contributing
16 member organizations. Through a chair or other designee, they will coordinate with
17 other work groups or monitoring entities to ensure that their efforts support and
18 complement other topic areas, and to address cross-topic (integrated) questions,
19 information needs, assessments, or hypotheses articulated by the Steering Committee,
20 Science Panel, or others. Some Work Groups already exist (and are funded) and should
21 be built upon, but some new groups will need to be established.

22
23 **Composition:** The Work Groups include representatives of state, local, and federal
24 agencies, tribes, business, environmental groups, universities and other research
25 institutions, and other key stakeholders that conduct monitoring and assessment activities
26 in the Puget Sound (i.e. – the monitoring entities). Typically, work group members will
27 be technical experts in those topic areas. The Steering Committee is responsible for
28 identifying and commissioning Work Groups. Work Groups may have a chair and vice-
29 chair selected by the Work Group members, and may develop bylaws as (if) needed.

30
31 **Monitoring Entities**

32
33 **Role:** The monitoring entities are responsible for collecting, managing, analyzing, and
34 reporting data for their organizations. Technical experts representing the monitoring
35 entities will largely make up the topical Work Groups. The monitoring and assessment
36 program is intended to add value to the efforts of individual monitoring entities, through
37 coordination and collaboration among related programs, facilitating standardization of
38 methods, approaches, and data management strategies, leveraging regional resources in
39 support of the Action Agenda, and other efficiencies. In turn, the monitoring entities will
40 contribute data and results to be incorporated in regional assessments, Partnership

1 reports, and other documents. Where new monitoring programs are needed or
2 recommended, these will generally be planned and implemented through coordination
3 and agreement with the appropriate monitoring entities.

4
5 **Composition:** The monitoring entities include organizations actually involved in
6 monitoring and assessing the Puget Sound ecosystem at all levels of government, tribes,
7 business, academia and citizen-science organizations.

8 9 **Puget Sound Partnership Staff**

10
11 **Role:** The Partnership will provide monitoring and assessment program staff to support
12 the Steering Committee and Work Groups including their initiatives and efforts. PSP
13 monitoring and assessment program staff will help facilitate, convene, coordinate and
14 monitor the progress of Work Groups and the Steering committee, and assist in updating
15 and informing the various bodies and advisory panels of decisions and issues of concern.
16 PSP staff will also facilitate and ensure the compilation, management, analysis,
17 assessment, interpretation, and reporting of regional and ecosystem-scale data and
18 information. PSP staff will also assure that data used for regional reporting are available
19 to any entity which wishes to independently analyze the same data. PSP staff will work
20 with staff from individual monitoring entities and elsewhere, and will coordinate with the
21 Steering Committee, Work Groups, and Monitoring Entities to compile and evaluate data,
22 develop results, facilitate peer review, and provide data and results to be included in the
23 State of the Sound report and the Puget Sound Update. PSP staff will also facilitate the
24 integration of monitoring and assessment program findings into the performance
25 management system.

26
27 **Composition:** The Partnership has a monitoring and assessment program manager and
28 staff who provide support to all levels of the monitoring and assessment program. Other
29 Puget Sound Partnership staff including the Science Program Director, Technical
30 Program Manager, Chief Information Officer, Performance Manager and technical staff
31 are anticipated to support the Monitoring Program as needed.

32 33 **Science Panel**

34
35 **Role:** The Science Panel is responsible for reviewing the monitoring and assessment
36 program for consistency with the Biennial Science Work Plan, the Action Agenda, and
37 sound scientific principles. It provides advice and recommendations to the Steering
38 Committee to ensure a solid scientific foundation for the program, including
39 recommendations for appropriate independent (3rd party) review of the program and peer
40 review of its products. The Science Panel can also be particularly helpful in clarifying

1 and articulating for the Steering Committee the specific questions, indicators, or
2 hypotheses on which the monitoring and assessment program should focus.

3
4 **Composition:** The Science Panel is appointed by the Leadership Council and is
5 composed of nine scientists. The Science Panel’s general role is to provide the
6 Leadership Council with independent scientific advice and peer review of the Action
7 Agenda, Monitoring Program, and indicators.

9 | **Advisory Boards**

11 **Ecosystem Coordination Board**

12
13 **Role:** The Ecosystem Coordination Board provides a linkage to a broad array of
14 stakeholders and their interests. Their main role is to advise the Leadership Council, be
15 its eyes and ears on citizen concerns, and provide outreach and education on the Action
16 Agenda. The ECB is informed of issues and decisions related to the monitoring program,
17 and can provide important advice to the Steering Committee with regard to regional and
18 local perspectives on monitoring and adaptive management.

19
20 **Composition:** The Ecosystem Coordination Board is composed of 27 members
21 representing different interests around the Puget Sound region and is appointed by the
22 Leadership Council. The ECB represents both the local action areas and region-wide
23 interests, and therefore is a key link between local and regional concerns.

26 **Leadership Council**

27 Composition: The Leadership Council has seven members and is appointed by the
28 Governor. The Leadership Council is the governing body of the Puget Sound Partnership.

29
30 Role: The Leadership Council provides the overall direction for the monitoring and
31 assessment program by virtue of establishing the goals, objectives, and strategies for the
32 Puget Sound Partnership to successfully implement the Action Agenda. The Leadership
33 Council also approves the governance framework of the monitoring and assessment
34 program.

36 ***Data Management and Access***

37 A key objective of the monitoring and assessment program is to collect, combine,
38 evaluate, and share data from multiple contributing partners and sources. The program’s
39 approach to data management should serve to unite information and data from multiple

1 sources to better answer questions and support decision making at all scales (local,
2 watershed, regional, and even statewide). To accomplish this, data must be:
3 1) Accessible (allow for easy discovery and be equally accessible to all interested
4 parties – including outside researchers and the public).
5 2) Comparable (indicators and metrics to be measured must be clearly defined and
6 measured using comparable protocols and methods)
7 3) Shareable (data must be transferable between different organizations and data
8 management systems).

9
10 Large, multi-agency monitoring programs are often challenged by incompatibility among
11 data management systems. This is a typical outcome of numerous agencies having
12 developed a variety of individual data management systems over many years – each
13 designed to meet a specific program need, set of mandates, or funding proviso – and each
14 designed for individual efficiency and developed using whatever information technology
15 or software was current at the time.

16
17 The key steps to development of an integrated, robust, flexible, and collaborative data
18 management system are outlined in the Puget Sound Strategic Science Plan (Puget Sound
19 Partnership 2010; Section 4.3.3). The Strategic Science Plan envisions a data architecture
20 that provides discovery, access, and visualization of data across a network of distributed
21 data management systems maintained by individual monitoring partners. Many
22 organizations involved in Puget Sound have made substantial investments in data
23 collection and information systems to support their needs. The Strategic Science Plan
24 recommends that the monitoring and assessment program takes advantage of, but
25 enhances the connectivity between existing data repositories and clearinghouses already
26 established in the Puget Sound region. From a practical perspective, this means most data
27 will continue to be owned and managed by the organizations that collect it, but with a
28 recognition that the monitoring and assessment program (and all users) benefits by
29 gaining access to those data. Likewise, the data providers themselves benefit as the
30 monitoring and assessment program works to expand their access to comparable or
31 complimentary data sets collected by other agencies and groups.

32
33 Therefore, the initial data management goals of the monitoring and assessment program
34 are (1) to assess the compatibility among the data management systems and data
35 repositories currently in use across the Puget Sound basin and to develop and implement
36 a plan for improving their compatibility and connectivity; (2) to facilitate and support the
37 creation, documentation, and use of standard data collection protocols for all facets of
38 field sampling, thereby enhancing the comparable nature of the data; and (3) to develop a
39 data management strategy that assures key information flows (for indicator data and for

1 data needed by managers, stakeholders, researchers, and the general public) are
2 coordinated, available, and accessible.

3

4 ***Reporting and Communication***

5 Communications and reporting are pivotal functions of the monitoring and assessment
6 program. To support its work, the program relies on resources and information being
7 provided from many different sources. Each of these people and organizations needs a
8 clear understanding of what information is required and how it is used. Also, the
9 program's success will be measured through its ability to support adaptive responses by
10 Puget Sound Partnership leadership and other decision makers. This depends on reporting
11 that is clear, creative, and compelling.

12

13 To boost the effectiveness of the monitoring and assessment program, a communications
14 and reporting strategy must address the interface between science and policy. This
15 requires engaging multiple sources of expertise in an integrated and collaborative
16 process. It includes building confidence that the information generated is relevant to
17 decision making, is technically credible, and is not biased by political influence. The
18 strategy should seek to build a common understanding of how science works, what it
19 does best, and what are reasonable expectations as to the certainty of results.

20 ***Communications***

21 The implementation of the Action Agenda relies on the participation by many agencies,
22 tribes, individuals, and stakeholder groups. Some actions are mandated specifically in
23 various statutes and programs, but many are voluntary and are less clearly defined. The
24 monitoring and assessment program reflects this diversity of roles, and its success
25 depends on creating a common understanding among participants and motivating them to
26 provide consistent, high-quality information. To accomplish this, the monitoring and
27 assessment Program should make active and continual efforts to enlist participation in the
28 Work Groups and to seek resources for completing the work.

29

30 Specifically, the goals of the communication efforts are to:

- 31 • Describe the rationale for and components of the monitoring and assessment
32 program.
- 33 • Develop a matrix of communication strategies for multiple audiences.
- 34 • Define the relationship between the monitoring and assessment program and
35 monitoring efforts conducted by others for individual functions and geographies.
- 36 • Demonstrate how monitoring information is used to inform decisions by Puget
37 Sound Partnership leadership and other entities.
- 38 • Specify information requirements, protocols, formats, and schedules.

- 1 • Articulate the need for funding and other resources to accomplish this work.
- 2 • Ensure that data, reports, plans, and other products of the monitoring and
- 3 assessment program are easily discoverable and accessible to all.

4 ***Reporting***

5 Monitoring results will continue to be evaluated and reported by individual monitoring
6 entities as part of their normal activities. PSP staff will frequently depend on those
7 efforts but may also independently compile, assess, synthesize, and report results as a
8 further contribution to the reporting functions of the Partnership, including the Biennial
9 Science Work Plan, the State of the Sound report, the Puget Sound Science Update, and
10 technical conferences like the Salish Sea Conference and South Sound Symposium. The
11 reporting functions of the monitoring and assessment program should:

- 12 • Reflect the program’s commitment to quality assurance and peer review of
13 science products.
- 14 • Report accurate information in appropriate formats; assemble results of analysis
15 and evaluation; and articulate the degree of confidence and consensus around
16 monitoring outcomes.
- 17 • Develop conceptual models and content methods to “tell the story” to different
18 audiences; in addition to ecological content, address process issues such as
19 accuracy, certainty, significance, risk, and cost/benefit.
- 20 • Coordinate and integrate reporting by multiple participating organizations and
21 entities.
- 22 • Provide information and analysis in ways that support decision-making and
23 inform the general public.
- 24 • Frame decision points and next steps to help prioritize and motivate future
25 actions.

27 ***Peer Review***

28 An objective, independent review process will help ensure that monitoring findings are
29 credible, independent, effective, open and transparent, legitimate, and salient. Peer review
30 is a fundamental tenet of good science (Biennial Science Work Plan 2010) and is
31 recognized by many tribal, local, state, and federal agencies as an essential component of
32 any monitoring program (e.g., Peer Review Advisory Group for EPA’s Science Policy
33 Council 2006; Van Cleve et al. 2004; WAC 365-195-900; Puget Sound Water Quality
34 Authority 1995; Puget Sound Assessment and Monitoring Program Steering Committee
35 and Management Committee 2008; Puget Sound Partnership 2010).

36

1 The Steering Committee, in consultation with the Science Panel and the Leadership
2 Council, will develop guidelines for, and every 4 years seek, an independent, 3rd party
3 review of the entire monitoring and assessment program, including:

- 4 1. Monitoring program functions and processes.
- 5 2. Questions being asked.
- 6 3. Methods proposed to answer the questions.
- 7 4. Results and conclusions.
- 8 5. The application of the results to the adaptive management plan.
- 9 6. The framework and strategies used for achieving the results.

10
11 In addition to seeking periodic programmatic reviews, the Steering Committee will also
12 provide recommendations to ensure a credible peer review process for all publications,
13 monitoring designs, reports, and other products emerging from the monitoring program.
14 (The Steering Committee should also assure the public availability of all such documents)
15 In many cases, monitoring entities already have their own, established peer review
16 processes. The Steering Committee may review those processes to assure program-wide
17 transparency and credibility.

18 ***Quality Assurance/Quality Control (QA/QC)***

19 A good QA/QC program is essential to ensure that data are of an acceptable level of
20 quality and the level of quality is well documented. Guidance for quality assurance and
21 quality control are widely available (e.g., Puget Sound Water Quality Authority 1988;
22 Puget Sound Assessment and Monitoring Program Steering Committee and Management
23 Committee 2008; Puget Sound Stormwater Work Group 2010; USA EPA 2008). A
24 QA/QC plan should be developed and implemented for all those contributing data
25 consistent with accepted state and federal guidelines and requirements.
26

27
28 It is cost effective to implement a stringent and rigorous quality assurance quality control
29 process within the monitoring and assessment program. It will make any discussion or
30 controversy focus on the interpretations, not the science and facts. Such a process will
31 make for a more efficient and faster adaptive management cycle. The measures will build
32 trust amongst stakeholders and agencies. It will reduce uncertainty about decisions, and
33 improve decision-making and decisions over time.
34

35 ***Funding***

36 The coordination, administration, and scientific success of the monitoring and assessment
37 program will depend on acquiring long-term, stable funding. However, funding for the
38 program will be complex because a wide spectrum of monitoring entities are anticipated
39 to participate in the Program. Collectively, these entities are expected to implement a

1 large number of functions and activities (Appendix 1). It is essential to factor in the costs
2 of monitoring and assessing the effectiveness of recovery actions whenever planning
3 studies, projects, or strategies r to improve the health of Puget Sound. Careful planning,
4 strategic monitoring, coordination, and sharing of information can reduce the overall
5 costs of monitoring.

6
7 The Work Groups will recommend what, when and where to monitor to the Steering
8 Committee, as well as estimate costs and provide ideas for strategies to fund monitoring
9 functions and activities. The Steering Committee will evaluate the needs, priorities, and
10 strategies for funding, and recommend how to distribute available funding. As the
11 monitoring and assessment program evolves, strategies commensurate with the program
12 functions and activities will need to be developed through the Steering Committee, the
13 Science Panel and the Leadership Council. In general, the Steering Committee is
14 expected to develop funding recommendations (priorities, gaps, etc.) for presentation to
15 the Leadership Council and Executive Director of the Partnership

18 ***Glossary***

19 **Compliance monitoring:** Monitoring to ensure that the outputs meet the standards as
20 required in the plan, or to comply with contractual or legal requirements For example a
21 culvert is replaced in a habitat restoration project. Did the culvert comply with the size,
22 slope, and drop required in the approved specifications and permits?

23 **Components (according to Open Standards):** The goals, objectives, strategies, and
24 assumptions that form the Action Plan.

25 **Conservation Target:** A limited suite of species, communities, and ecological systems
26 that are chosen to represent and encompass the full array of biodiversity found in a
27 project area. An example for Puget Sound is Chinook Salmon.

28 **Dashboard Indicators:** The Puget Sound Partnership environmental dashboard
29 indicators include: Annual wild harvest of tribal and non-tribal commercial fisheries;
30 percent of core beaches meeting water quality standards; number of acres of shellfish
31 beds impacted by degraded water quality; number of recreational fishing licenses sold
32 annually; marine water quality index; freshwater quality index; percent of monitored
33 stream flows below critical levels; wild Chinook population abundance; southern resident
34 killer whale population trends; Pacific herring spawning biomass; terrestrial birds;
35 percent of marine and freshwater shorelines armored; areal extent of eelgrass; toxic levels
36 in fish; level of toxics in marine sediments; changes in land use and land cover by type.

37 **Effectiveness Monitoring:** Determines whether a management action has been effective
38 in addressing a threat to the environment. Depending upon the action taken, monitoring
39 can be extensive or minimal. Action effectiveness monitoring has been tied to such
40 threats as habitat restoration and enhancement, changes to hatchery operations, pollution

1 discharge elimination systems, and harvest constraints. Proper action effectiveness
2 monitoring is characterized by a before and after treatment design. Examples of ongoing
3 action effectiveness monitoring include: Habitat Conservation Plans developed for
4 private timberlands under the Forest and Fish Agreement, total maximum daily loading
5 (TMDL) monitoring required under the Clean Water Act; Salmon Recovery Funding
6 Board monitoring of habitat restoration projects, and harvest and hatchery monitoring
7 required under the Endangered Species Act. Action effectiveness monitoring answers the
8 question: Did the management action have the intended output being targeted?

9 **Evaluation** – An assessment of a project or program in relation to its own previously
10 stated goals and objectives.

11 **Implementation monitoring:** Monitoring to ensure that the project is implemented as
12 per plan and schedule.

13 **Key Ecological Attributes (according to Open Standards):** An aspect of a
14 conservation target’s biology or ecology that if present, defines a healthy conservation
15 target and if missing or altered would lead to the outright loss or extreme degradation of
16 that conservation target over time.

17 **Logic model/Results chains:** Logical Framework – Often abbreviated as logframe. A
18 matrix that results from a logical framework analysis that is used to display a project’s
19 goals, objectives, and indicators in tabular form, showing the logic of the project.

20 **Monitoring:** (3 definitions)

21 a) Refers to the systematic process of collecting and storing data related to particular
22 natural and human systems at specific locations and times (Busch and Trexler 2003).

23 b) The periodic collection and evaluation of data relative to stated project goals and
24 objectives. Many people often also refer to this process as monitoring and evaluation
25 (Conservation Measures Partnership 2007).

26 c) A range of activities needed to provide management information about environmental
27 conditions or contaminants. Depending on the requirements of any particular situation,
28 these activities could include conceptual and numerical modeling, laboratory and field
29 research, preliminary or scoping studies, time-series measurements, data analysis,
30 synthesis, and interpretation. A monitoring system is integrated and coordinated with the
31 specified goal of producing predefined management information; it is the sensory
32 component of environmental management (NRC 1990).

33 **Monitoring entity:** A federal, state, or local agency, tribe, non-government organization
34 or volunteer group conducting systematic monitoring of an ecological or human attribute.

35 **Open Standards:** “Open Standards are common concepts, approaches, and terminology
36 in conservation project design, management, and monitoring in order to help practitioners
37 improve the practice of conservation. In particular, these standards are meant to provide
38 the steps and guidance necessary for the successful implementation of conservation
39 projects, and are developed through public collaboration, freely available to anyone, and
40 not the property of anyone or any organization and can thus be freely redistributed.”

1 The *Open Standards* five steps that comprise the project management cycle. The steps
2 include:

- 3 1. **Conceptualize** what you will achieve in the context of where you are working.
- 4 2. **Plan** both your Actions and Monitoring.
- 5 3. **Implement** both your Actions and Monitoring.
- 6 4. **Analyze** your data to evaluate the effectiveness of your activities. Use your
7 results to adapt your project to maximize impact.
- 8 5. **Capture and Share** your results with key external and internal audiences to
9 promote
10 **Learning.**

11 **Peer Input:** Recommended changes or additions to a report or monitoring procedure
12 from other independent scientists or experts recognized as competent in their field and
13 who will have the expertise and knowledge necessary recommend those changes.

14 **Peer Review:** Formal review of a publication or report by other independent scientists or
15 experts recognized as competent in their field and who will have the expertise and
16 knowledge necessary to determine whether the scientific paper or report has followed the
17 scientific method and has presented clear conclusions based on scientific data provided in
18 the report and having used clear statistical procedures.

19 **Puget Sound interested entity:** Any individual, organization or entity that has an
20 interest in the health of Puget Sound and its watersheds.

21 **Quality Assurance:** Quality Assurance is about Process. It describes the proactive
22 method of establishing a process that is capable of producing a product or deliverable that
23 is error or defect free. In the world of natural sciences this is seldom possible. However,
24 the level of precision and accuracy should be set, and the methods clearly defined that
25 will provide the greatest confidence in the data.

26 [http://www.modernanalyst.com/Resources/BusinessAnalysisGlossary/tabid/231/Default.a](http://www.modernanalyst.com/Resources/BusinessAnalysisGlossary/tabid/231/Default.aspx#Q)
27 [spx#Q](http://www.modernanalyst.com/Resources/BusinessAnalysisGlossary/tabid/231/Default.aspx#Q)

28 **Quality Control:** Quality Control is about Products or Deliverables. It describes
29 checking a final product or deliverable to ensure that it is defect or error free and meets
30 specifications. In the natural sciences it entails attempting to measure the precision and
31 accuracy of results with known statistical confidence.

32 [http://www.modernanalyst.com/Resources/BusinessAnalysisGlossary/tabid/231/Default.a](http://www.modernanalyst.com/Resources/BusinessAnalysisGlossary/tabid/231/Default.aspx#Q)
33 [spx#Q](http://www.modernanalyst.com/Resources/BusinessAnalysisGlossary/tabid/231/Default.aspx#Q)

34 **Status/Trend Monitoring:** Status monitoring characterizes existing environmental
35 conditions. It is a starting point for future comparison of change. It may also act as a
36 reference point for “Desired Future Condition”. Trend monitoring involves measurements
37 taken at regular intervals. It describes characteristics of indicators over time. Examples of
38 status/trend monitoring include; water quality, salmon population abundance, flow,
39 habitat characteristics, toxin levels in organisms, etc.

40 **Validation (Cause and Effect) Monitoring:** Validation monitoring answers the
41 question: Did the management output or outputs create the intended outcome? This

1 question often involves evaluating the effects of numerous projects on a watershed or
2 species. An example would be: Has the cumulative effects of habitat restoration actions
3 in a specific river resulted in producing more juvenile salmon that migrate to the sea?

4 Another example: Has the cumulative effects of changes in forest practice rules and
5 methods resulted in improved water quality and instream and riparian habitat on forest
6 lands?

7 **Viability Assessment (according to Open Standards):** An analysis of the conservation
8 target to determine the acceptable range of variation and then an evaluation of its current
9 status and its desired future status. The desired future status of all of the attributes of the
10 target becomes the goal for this target.

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Appendix 1
(see next page)

Appendix 1. Description of the roles and responsibilities of program components in implementing the functions or activities of the Puget Sound Coordinated Ecosystem Monitoring and Assessment Program. The monitoring functions or activities will be rooted in the adaptive management approach adopted by the Puget Sound Partnership.

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
1	<p>Indicators and monitoring questions in service to the adaptive management plan, local and agency-specific mandates, and other critical information needs of the Puget Sound Partnership and its contributing partners.</p> <p>Regional-scale questions will be in part derived from indicators for ecosystem, human health and well-being (including the Dashboard of Indicators), threat reduction targets, and strategy effectiveness.</p>	1a, 1b	<p>Identify the questions and hypotheses that existing monitoring programs conducted by the entities are attempting to answer.</p> <p>Work with PSP to ensure alignment of the PSP, GMAP, and EPA indicators and performance measures.</p>	<p>Compile and coordinate inventory of the questions and hypotheses being addressed by monitoring entities.</p> <p>Propose high level questions and indicators for Steering Committee consideration; develop more detailed sub-questions or hypotheses which need to be answered to address critical uncertainties.</p>	<p>Reconcile and integrate high level monitoring questions from all Work Groups.</p> <p>Engage and seek science, policy, and management input from the SP, ECB, and Work Groups.</p> <p>Decide final list of high level monitoring questions to be addressed by the program (most of which should be consistent with indicators) and direct Work Groups accordingly.</p>	<p>Identify indicators (this is SP role from statute)</p> <p>Recommend to Steering Committee high level questions, indicators and targets</p> <p>consistent with the Biennial Science Work Plan, the Strategic Science Plan, the Puget Sound Science Update and relevant to the Action Agenda</p>	<p>Review and provide input on proposed indicators, targets, and monitoring questions when appropriate.</p>	<p>Approve PSP indicators and targets.</p>	<p>Support, assist and ensure coordination between different program components.</p> <p>Manage the adaptive management planning and executing process.</p> <p>Coordinate development of indicators and targets. Facilitate interdisciplinary teams and cross-partnership</p>	<p>Plan Actions and Monitoring</p>

Row	Product	Goal	Program Components						Adaptive Management Step		
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff	
2	Inventory of existing monitoring that fulfills the adaptive management plan and identifies important monitoring gaps, uncertainties, data quality issues and research needs	1b, 1c, 1e, 2a	Identify existing monitoring efforts and the questions, indicators, and hypotheses they are intended to answer; Identify gaps, uncertainties, data quality issues and research needs.	Help develop and refine operational definitions for indicators (Work Groups will include Indicator Champions). Compile information from monitoring entities. Evaluate and prioritize (within topic areas) current monitoring including gaps, uncertainties, data quality issues and research needs taking into account different scales.	Integrate input from all Work Groups. Engage and seek science, policy, and management input from the SP, ECB, and Work Groups. Prioritize current monitoring, gaps, uncertainties, data quality issues and research needs across Work Groups (topic areas) that need to be addressed by program.	Advise SC on relative priorities of critical data gaps, uncertainties, data quality issues and research needs. Recommend needed research.	No role	No role	No role	Support, assist and ensure coordination between different program components.	Plan Actions and Monitoring
3	Priorities for new and existing monitoring that meets the needs of the adaptive management	1b, 2a, 2b	Recommend priorities that address the	Evaluate and prioritize monitoring and	Integrate input from all Work Groups.	Advise Steering Committee on priorities	Review and provide input.	Review advice from SP and input	Support, assist and ensure coordination	Plan Actions and Monitoring	

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
			monitoring questions and requirements of the monitoring entities as well as the regional indicators and program needs.	assessment needs for their topic.	Engage and seek science, policy, and management input from the SP, ECB, and Work Groups and make any adjustments to high level priorities. Evaluate the monitoring needs and priorities across topic areas. Decide on high-level priorities for the monitoring program and submit priorities to Science Panel for inclusion in the Biennial Science Plan, Strategic Science Plan and Action Agenda.	consistent with the Biennial Science Work Plan, Strategic Science Plan and the Action Agenda. Advise Steering Committee on criteria for prioritization.		from ECB and provide input to Steering Committee, when appropriate.	between different program components and ensure consistency with Puget Sound Partnership needs.	
4	Monitoring plans and work plans (includes monitoring priorities, literature reviews, protocols, study designs, quality assurance plans, implementation plans, etc)	2b, 3a, 3b	Develop monitoring plans, protocols, study designs, QA plans and implementation plans for ongoing and proposed new monitoring that	Develop topic-based monitoring plans, protocols, study designs, AQ plans and implementation plans for ongoing and proposed new	Direct development of topic-based work plans based on priorities. Approve monitoring plans and work plans. Ensure plans are consistent with Biennial	Review monitoring plans for consistency with Biennial Science Work Plan, Strategic Science Plan and Action Agenda.	Provide input on acceptable levels of certainty vs costs.	Review advice from SP and input from ECB and provide input to Steering Committee	Support, assist and ensure coordination between different program components and ensure	Plan Actions and Monitoring

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
			addresses agency mandates and needs Adopt protocols and QA/QC plans to ensure consistency in data collection, management and analysis across the region and topics	monitoring based on direction from SC. Coordinate with monitoring entities and among work groups when developing these products. Seek Steering Committee approval	Science Work Plan, Strategic Science Plan and Action Agenda. Direct PSP staff to compile and publish all monitoring plans, study designs and protocols across Work Groups. Seek input from Science Panel and ECB on acceptable levels of certainty vs. costs.	Include (high level?) monitoring plan in the Biennial Science Work Plan. Advise Steering Committee on acceptable level of certainty. Advise Work Groups on criteria for assessing monitoring designs and QA/QC.		on level of precision and accuracy desired versus costs when appropriate.	consistency with Puget Sound Partnership needs Compile and publish all monitoring plans, study designs and protocols across Work Groups (on behalf of SC)	
5	Costs of prioritized monitoring	1a, 1b, 1c, 1e, 2a, 4a	Provide information on costs of monitoring. Estimate costs for any new monitoring identified by the	Compile, estimate and review the costs of existing and new monitoring within their topic and report to Steering	Complete the cost estimates from all of the Work Groups. Evaluate overall costs of implementing the program and prepare	Review cost estimates for consistency with the Biennial Science Work Plan and the Action Agenda.	Informed of costs and discuss interested Puget Sound entities' concerns.	Informed of costs and Science Panel ECB input and discuss interested	Support, assist and ensure coordination between different program components.	Plan Actions and Monitoring

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
			Steering Committee.	Committee.	budget. Make recommendations to PSP for overall priority of current and new funding and possible shifts in funding within existing monitoring. Recommend how funds are spent for those funds available directly for the program. Seek input from the Leadership Council, Science Panel, ECB and PSP staff.			Puget Sound entities' concerns.	Review cost estimates for consistency with Puget Sound Partnership needs and impacts on state and federal budget. Report costs as part of the biennial cost estimates to implement Action Agenda. Oversee funding expenditure for PSP funds.	
6	Funding		Identify need to fund monitoring Propose funding in annual/biennial	Identify need to fund monitoring.	Identify need to fund monitoring. Develop long-term funding strategy for	Advocate for monitoring support to a variety of agencies and	Advocate for monitoring support to a variety of agencies and	Advocate for monitoring support to a variety of agencies and	Advocate for monitoring support to a variety of agencies and	Support, assist and coordinate between different program

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
			budget requests Seek funding		implementing the program.	levels of government (e.g., Congress, legislature, state and federal agencies, tribes, NGOs, businesses)	fund sources and political entities (e.g., watershed, local jurisdictions, legislature, state and federal agencies, tribes, NGOs, businesses)	levels of government (e.g., Congress, legislature, state and federal agencies, tribes, NGOs, businesses) Approve Puget Sound Partnership budget	components Advocate for monitoring support and highlight that monitoring priorities are consistent with needs identified and agreed to by Puget Sound Partnership Include monitoring needs in biennial budget requests	
7	Data collection, management, assessment, analysis and interpretation at the topic, local and/or ecosystem level	1a, 1b, 1c, 1d, 2a, 3a.	Collect, manage, analyze, assess and interpret data at all levels, when appropriate and depending on entity	Determine what data need to be collected where and how. Ensure roll-up at	Ensure transparency and accessibility of data. Review and resolve data problems identified by the Work Groups.	Informed Review and confirm validity of assumptions and	Informed	Briefed on any problem areas	Seek funding Support and coordinate data management, QA/QC, and analyses	Analyze, Use, Adapt

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
		4a, 4b	<p>goals.</p> <p>Evaluate data</p> <p>Support GMAP performance measures, as part of the Monitoring entities' performance management systems.</p>	<p>regional scales.</p> <p>Submit results to Steering committee with any comments.</p> <p>Compile draft results from each entity for review and discussion.</p> <p>Synthesize findings within topic areas.</p>	<p>In coordination with the Science Panel, review and confirm validity of assumptions and interpretation of results.</p> <p>Review and ensure robust statistical analyses and that all methods, calculations and interpretations are available and transparent</p> <p>Ensure appropriate peer review and QA/QC procedures are implemented</p> <p>Review for cross work group linkages.</p> <p>Commission Work Groups or contracts for cross-topic synthesis and integration of results across topics.</p>	<p>interpretation of and results</p>			<p>Conduct analyses, synthesis and roll-up across scales and topics</p> <p>Work with monitoring entities on any questionable results</p> <p>Conduct analyses for performance management</p>	

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
8	Production of reports and communication of results in context	2b, 4a, 4b	<p>Provide results on a periodic basis to appropriate Work Groups</p> <p>Collaborate with PSP staff and Work Groups to communicate results (e.g. State of the Sound report)</p> <p>Produce and communicate their own results to their stakeholders</p>	<p>Compile results</p> <p>Collaborate with PSP staff and on production and communication</p>	<p>In coordination with the Science Panel, review and confirm validity of assumptions and results</p> <p>Vet materials and recommend to Science panel how they are or should be used by policy groups (Leadership Council and Ecosystem Board) before the policy groups communicate to the Governor, Legislature, Congress, local constituencies or the media</p> <p>Present reports to Science Panel</p> <p>Compile a summary report from all Work Groups and provide context</p> <p>Collaborate with PSP staff on production and communication</p>	<p>Review and endorse reports</p> <p>Vet materials and recommend how they are or should be used by policy groups (Leadership Council and Ecosystem Board) before the policy groups communicate to the Governor, Legislature, Congress, local constituencies or the media</p>	<p>Informed</p> <p>Comment on reports to Science Panel and Leadership Council</p> <p>Use good, relevant, vetted information, set in context, to Inform Governor, Legislature, Congress and media</p> <p>Use good, relevant, vetted information, set in context, to communicate with member groups' constituencies</p>	<p>Review reports</p> <p>Use good, relevant, vetted information, set in context, to Inform Governor, Legislature, Congress and media</p>	<p>Communicate ecosystem-level results and local and topic level as needed or appropriate</p> <p>Produce PSP required reports (e.g. State of the Sound) in collaboration with Monitoring Entities, the Work Groups and Technical Committee</p> <p>Communicate indicators and targets and</p>	<p>Capture and Share Learning</p>

Row	Product	Goal	Program Components						Adaptive Management Step	
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff
9	Revisit questions, assess data gaps and uncertainties and address performance findings to adaptively manage monitoring program in response to adaptive management, policy decisions and scientific needs	1	<p>Collaborate with Work Groups and PSP staff to evaluate questions, gaps, priorities, methods and modify using adaptive management tools</p>	<p>Evaluate questions, gaps, priorities, methods and modify using adaptive management tools</p> <p>Synthesize evaluation results</p>	<p>Develop recommendations on needed modifications and re-alignment of monitoring plans</p> <p>Influence appropriate decision-making processes</p>	<p>Informed and provide input</p> <p>Influence appropriate decision making processes</p>	<p>Informed and provide input</p> <p>Influence appropriate decision making processes</p>	<p>Staff will develop and manage a process and advise the Steering Committee</p> <p>Make</p>	<p>performance management work processes and deliverables to inform stakeholders, partners and PSP staff</p> <p>Update website</p> <p>Produce Action Agenda, Biennial Science Work Plan and State of the Sound</p>	

Row	Product	Goal	Program Components						Adaptive Management Step		
			Monitoring entities	Work Groups	Steering Committee	Science Panel (SP)	Ecosystem Coordination Board (ECB)	Leadership Council (LC)		PSP Staff	
				at topic level	Synthesize evaluation of questions, gaps, priorities, methods and modify as needed using adaptive management tools across topics				When change is required, facilitates/moderates discussions about modifying the Monitoring Program, monitoring plans or activities of monitoring entities	recommendations to SP, LC, and SC	