
**Prioritization of Strategic Actions Identified in the
Mat-Su Basin Salmon
Strategic Action Plan, 2008**

**Developed by the
Matanuska-Susitna Basin Salmon Habitat Partnership**

June 2008

TABLE OF CONTENTS

	Page
LIST OF FIGURES	ii
LIST OF APPENDICES	ii
INTRODUCTION.....	1
METHODS.....	3
Participants	3
Operating Guidelines.....	3
The Prioritization Approach.....	3
Establishing Priorities.....	4
Inconsistency	6
Structural Adjust.....	6
RESULTS.....	7
Focal Issue 1: Alteration of Riparian Areas	8
Focal Issue 2: Filling of Wetlands	11
Focal Issue 3: Impervious Surfaces and Stormwater Runoff	13
Focal Issue 4: Septic Systems, Limited Wastewater Collection and Treatment	16
Focal Issue 5: Culverts that Block Fish Passage	18
Focal Issue 6: Loss of Water Flow or Volume	21
Focal Issue 7: Loss of Estuaries and Nearshore Habitats	23
Focal Issue 8: Invasive Northern Pike	25
CONCLUSIONS	27
LITERATURE CITED.....	28
APPENDIX A	30
APPENDIX B.....	31

LIST OF FIGURES

Figure	Page
1a. Framework of the focal issue, alteration of riparian areas, including unadjusted weights of importance	8
1b. The adjusted priority of strategic actions for the focal issue, alteration of riparian areas, Mat-Su Basin, 2008	10
2a. Framework of the focal issue, filling of wetlands, including unadjusted weights of importance.....	11
2b. The adjusted priority of strategic actions for the focal issue, filling of wetlands, Mat-Su Basin, 2008.....	12
3a. Framework of the focal issue, impervious surfaces and stormwater runoff, including unadjusted weights of importance.....	13
3b. The adjusted priority of strategic actions for the focal issue, impervious surfaces and stormwater runoff, Mat-Su Basin, 2008.....	15
4a. Framework of the focal issue, septic systems, limited wastewater collection and treatment, including unadjusted weights of importance.....	16
4b. The adjusted priority of strategic actions for the focal issue, septic systems, limited wastewater collection and treatment, Mat-Su Basin, 2008	17
5a. Framework of the focal issue, culverts that block fish passage, including unadjusted weights of importance	18
5b. The adjusted priority of strategic actions for the focal issue, culverts that block fish passage, Mat-Su Basin, 2008.....	20
6a. Framework of the focal issue, loss of water flow or volume, including unadjusted weights of importance.....	21
6b. The adjusted priority of strategic actions for the focal issue, loss of water flow or volume, Mat-Su Basin, 2008.....	22
7a. Framework of the focal issue, loss of estuaries and nearshore habitats, including unadjusted weights of importance	23
7b. The adjusted priority of strategic actions for the focal issue, loss of estuaries and nearshore habitats, Mat-Su Basin, 2008	24
8a. Framework of the focal issue, invasive northern pike, including unadjusted weights of importance.....	25
8b. The adjusted priority of strategic actions for the focal issue, invasive northern pike, Mat-Su Basin, 2008.....	26

LIST OF APPENDICES

Appendix	Page
A. Representatives from local, state and federal agencies and nongovernmental organizations comprising the Steering Committee of the Mat-Su Basin Salmon Habitat Partnership	30
B. Participants in the Mat-Su Basin salmon habitat prioritization workshop	31

INTRODUCTION

The Matanuska-Susitna (Mat-Su) Basin Salmon Habitat Partnership¹ (Partnership) initiated a strategic planning process in fall 2005 to identify and prioritize actions needed to protect, enhance and restore habitat for wild salmon and other fish species in a region experiencing increasing human use and development. The Partnership, comprised of regional professionals and representatives from diverse interests, envisioned a collaborative and cooperative approach in addressing fish habitat conservation concerns in the Mat-Su Basin, including water quality and quantity issues, and habitat fragmentation. Formation of the Partnership occurred under the auspices of the National Fish Habitat Initiative. In accordance with the National Fish Habitat Action Plan, the intent of the Partnership is to ensure sustained fish productivity in balance with healthy human populations through aquatic habitat protection, enhancement and restoration.

The Partnership's Steering Committee, comprised of representatives from leading local, state and federal agencies as well as nongovernmental organizations (Appendix A), structured the planning process to include development of the plan, followed by prioritization of the plan's strategic actions.

The process selected by the Steering Committee for development of the plan is called the Conservation Action Planning Process (see www.conserveonline.org/workspaces/cap/ for more information about this planning process). Detailed results can be found in the document entitled "Conserving Salmon in the Mat-Su Basin: the Strategic Action Plan of the Mat-Su Basin Salmon Conservation Partnership 2008" (Plan) (www.conserveonline.org/workspaces/MatSuSalmon/strategicactionplan). Development of the plan focused on identifying critical species and ecological systems (termed conservation targets) in the Mat-Su Basin, using expert judgment to assess the viability of and potential threats to these conservation targets, and suggesting strategic actions to achieve objectives of either abating threats or enhancing the viability of the conservation targets. Eight focal issues important to conservation of salmon and salmon habitat in the Mat-Su Basin were identified:

1. Alteration of riparian areas
2. Filling of wetlands
3. Impervious surfaces and stormwater runoff
4. Septic systems, limited wastewater collection and treatment
5. Culverts that block fish passage
6. Loss of water flow or volume
7. Loss of estuaries and nearshore habitats
8. Invasive northern pike.

¹ The name of the Partnership reflects a revision made in June 2008, to bring the name of the Partnership in line with recommendations from the National Fish Habitat Board.

Strategies for preventative, protective or restorative actions were developed for each focal issue by working groups and were formatted as objectives and their suggested strategic actions.

The Steering Committee recognized that to ensure strategic use of limited funds and resources, a process to prioritize objectives and strategic actions within focal issues was needed. Prioritized objectives and strategic actions will provide partners with the best possible guidance for salmon habitat conservation activities in the Mat-Su Basin, and will assist in the prioritization of projects for funding through the National Fish Habitat Action Plan and other fish habitat programs. The process selected by the Steering Committee to prioritize the plan is called the Analytic Hierarchy Process (Saaty 1999; see www.decisionlens.com/solutions/meth_hierarchy.htm for more information about the process). Prioritization of the plan's strategic actions was completed in May 2008 through a facilitated workshop.

The purpose of this report is to describe and present the prioritization component of the Mat-Su salmon Partnership's strategic planning process. This report can be found online at www.conserveonline.org/workspaces/MatSuSalmon/strategicactionplan).

METHODS

PARTICIPANTS

Participants in the one day workshop (convened on May 21, 2008) represented regional professionals and interested persons of varying expertise and management responsibility across the eight focal issues of the Plan, balanced with the logistic considerations concerning group size. A total of 15 participants attended the workshop (Appendix B). The workshop was chaired by staff from Alaska Department of Fish and Game (ADFG), Sport Fish Division, and assisted by staff from the U.S. Fish and Wildlife Service. A professional facilitator and decision analyst, Dr. Margaret Merritt (Resource Decision Support), was hired to provide a review in decision-making methodology, guide the group discussion, and report on the workshop results.

OPERATING GUIDELINES

Prior to the workshop, the Steering Committee established that each focal issue will be treated independently, in part because funds will likely be allocated as opportunities arise, and in accordance with the mission and interests of agencies and organizations. The Steering Committee realized during the course of the prioritization workshop that to allow structural (the deletion or addition of objectives and strategic actions) as well as wording changes would improve the Plan by reducing redundancy and clarifying original intent of the plan, thus creating a clearly understandable and workable document.

THE PRIORITIZATION APPROACH

A systems approach, the Analytic Hierarchy Process (AHP) was used to structure the problem and derive priorities using expert judgment (Saaty 1999). Expert judgment is defined as “previous relevant experience, supported by rational thought and knowledge” (Saaty and Kearns 1985). The AHP has been used extensively for decades to address planning, conflict resolution, and prioritization in such areas as policy development, economics, engineering, medical and military science, and has more recently been applied to fisheries research and management (Merritt 1995, 2000, 2001; Merritt and Skilbred 2002; Merritt and Criddle 1993; KRSA 2005, 2006, 2007; SSLMC 2007; USFWS 2005, 2006 a, b, c). The AHP is a tool for facilitating decision-making by structuring the problem into levels comprising a hierarchy. Breaking a complex problem into levels permits decision makers to focus on smaller sets of decisions, improving their ability to make accurate judgments. Structuring also allows decision makers to think through a problem in a systematic and thorough manner. The AHP encourages people to explicitly state their judgments of preference or importance. Decision support software, Expert Choice,² was used interactively to structure the problem, depict the influence of weights, and derive the priority of elements.

² Forman, E., T. Saaty, M. Selly, and R. Waldron. Expert Choice, Decision Support Software, McLean VA. 1983.

ESTABLISHING PRIORITIES

Hierarchies were developed prior to the workshop through the Conservation Action Planning process. Focal issues form the top of the hierarchies. The second level is comprised of objective statements. An objective is a measurable statement of purpose, and serves as an intermediary step. The third and bottom level of each hierarchy is comprised of strategic actions. Strategic actions are specific tasks that need to be completed in order to achieve the objective.

Participants in the workshop were first tasked with developing criteria for judging importance among objectives and strategic actions. A total of eight criteria were selected by the group, and these appear below:

1. Degree of relevance to the overall intent of the strategic plan. The plan's overall intent is to "...identify long term goals, strategies and voluntary actions that the Partnership and others can undertake to conserve salmon habitat".
2. Sequential order, where one objective/strategic action must occur prior to the initiation of another.
3. Addresses a pervasive threat, or prevents impending and irreversible damage; without corrective action, there is high vulnerability for damage to salmon.
4. Public acceptance of the objective/strategic action, which is very important to the successful outcome from a strategic plan.
5. Cost-effectiveness of the objective/strategic action. For example, prevention is more cost-effective than restoration, and a cost-effective strategic action is more likely to be done than one that is more costly.
6. Partnership opportunities. For example, the Army Corps of Engineers emphasizes cooperative projects.
7. Increases sustainability by reducing uncertainty, risk, and data gaps. This criterion parallels a concept in Alaska's sustainable salmon fisheries policy – that is, in the face of uncertainty, act in precautionary manner.
8. Fosters stewardship behavior. For example, a strategic action that would alter or encourage human behavior to increase stewardship would be more favored.

The group decided not to prioritize objectives and strategic actions based on intensity of salmon use or management intensiveness because there is no direct link between economic value of the resource and habitat conservation concerns. The group elected not to prioritize based on geography (e.g., the Little Susitna River vs. the Deshka River) because the conservation strategies do not focus specifically on geography.

Using the above criteria as guidelines, individuals were asked to use their expert judgment in assigning pairwise comparisons of importance to objectives and their strategic actions within each focal issue, using horizontal bars displayed on a screen. The

bars were a graphical representation of a positive ratio scale. A verbal and numerical depiction of the ratio scale is shown below,

Scale of Importance	Definition
9	Extreme importance
7	Very strong importance
5	Strong importance
3	Moderate importance
1	Equal importance

where numbers between those listed (e.g., 2, or 2.5, etc.) were used to interpolate meanings as a compromise.

The relative importance of the objectives was first evaluated, then that of the strategic actions within each objective. Participants were given time to think and write their ratings of importance down on paper before sharing their judgments. Elements judged to be of equal importance were given equal scores. Consensus within a range of two to three points on the rating of elements was usually achieved among participants. When disparity in judging importance occurred, it meant there was disagreement, and discussion and debate was encouraged. Debates advanced the understanding of important concepts and often resulted in a clearer definition of the objective or strategic action. By seeking consensus not only was dialogue and learning encouraged, but also the formation of a group solution, rather than individual solutions, was promoted.

Expert Choice was used interactively to depict the influence of weights and derive the priority of strategic actions. Priorities approximate the strength of importance for each strategic action adjusted to reflect the importance assigned to the objective addressed by that strategic action. Mathematically, relative ratings of importance are entered into a vector and normalized. The values from the vector are then multiplied by the weight in the next highest level, and the result is the weight of importance for strategic actions. The total score for each strategic action is then calculated by adding the weighted proportions over all objectives within a focal issue:

$$T_m = \sum_{k=1}^d W_k p_{k,m}$$

where

- T_m = the total weighted score for strategic action m ,
- W_k = the weight for objective k ,
- $p_{k,m}$ = the weighted proportion of the total score for strategic action m addressing objective k
- d = the number of strategic actions.

INCONSISTENCY

One source of error in decision-making that can be minimized using the AHP is error associated with inconsistency in logic. Pairwise comparisons of importance allows the measurement of inconsistency. For example, if you said that A is more important than B, and B is more important than C, but then C is more important than A, you would be inconsistent in your judgments. While some inconsistency is tolerable when many elements are being compared by a group of people, in general, the overall inconsistency score should be less than 0.1 for the set of judgments to be considered reasonably consistent. By using pairwise comparisons in the prioritization workshop, the inconsistency of group judgments was examined using Expert Choice software.

STRUCTURAL ADJUST

Structural imbalance in the hierarchy can lead to dilution of the weight of many strategic actions under a single objective, so an adjustment feature in Expert Choice can be used to restore priorities to their respective proportion of weight. While approximate balance is sought and desired, complex problems do not always lend themselves to balance – thus the advantage of the structural adjust feature.

In a conceptual example, consider that if an objective (A) has four strategic actions, and another objective (B) has two strategic actions, then there are six strategic actions in all and structural adjusting multiplies A's priority by $4/6$ and B's by $2/6$. Thus, the overall priorities for A's strategic actions are not diluted simply because there are many of them.

RESULTS

A logically constructed hierarchy is a by-product of the AHP approach. As participants in the workshop used the AHP to discuss words associated with focal issues, objectives, and strategic actions of the Plan, and relate phrases, they offered several suggestions to improve the clarity and logic of the Plan. This document reflects changes suggested by participants in the workshop and approved by the Steering Committee.

One suggested change approved by the Steering Committee concerned the Anadromous Waters Catalog³ (catalog). During the workshop the group discerned that the catalog had been edited from several focal issues in an effort to reduce redundancy, and was left as an objective (and strategic action) under the focal issue, “Culverts that block fish passage”. When the group gave some thought to the situation, several participants advocated that the role of the catalog to conservation of salmon is an overarching solution that is applicable across varying focal issues. The Steering Committee decided that the catalog should be established as a focal issue of the Plan. An additional change approved by the Steering Committee was to revise the bold headings preceding objectives and strategic actions in the “Conservation Strategies” section of the Plan to match the explanatory text beneath.

³ The ADFG documents waters that are important for the spawning, rearing or migration of anadromous fishes.

FOCAL ISSUE 1: ALTERATION OF RIPARIAN AREAS

A total of 11 elements comprise the framework (Figure 1a): three objectives and eight strategic actions. Objective 2 has five suggested strategic actions, compared to just one or two strategic actions under objectives 1 and 3. Since the framework is imbalanced, the structural adjust feature in Expert Choice was used to restore priorities to their intended proportion of weight.

FOCAL ISSUE	OBJECTIVE	STRATEGIC ACTION
1.000 1. Alteration of riparian areas	0.343 1. By 2015 half of salmon riparian areas are mapped, assessed & prioritized	0.343 1.1. Map and prioritize riparian habitats
	0.517 2. By 2015 protect at least 10% of priority riparian habitat	0.032 2.1. Synthesize existing riparian habitat protections
		0.191 2.2. Support development of local land use planning
		0.116 2.3. Protect state lands with FRPA buffers & retention
		0.080 2.4. Promote BMPs for riparian habitat standards
		0.098 2.5. Protect riparian areas with easements & acquisition
	0.140 3. By 2015, restore 5% of altered riparian habitat	0.075 3.1. Implement pilot project
		0.065 3.2. Conduct riparian restoration projects

Figure 1a. Framework of the focal issue, alteration of riparian areas, including unadjusted weights of importance.

Several participants asked for clarification of terms used in the context of this focal issue. For the purposes of the prioritization workshop, “riparian areas” important to salmon were clarified as primarily consisting of a 100 foot buffers that are proximal/adjacent to habitat occupied by salmon. “Priority areas” for salmon have yet to be defined. “Map” implies assessment; to be more definitive, it was suggested that objective 1 be modified to include the word, “assess”.

In examining the relative importance among objectives, the group discussed the concepts of “identify and map” and “protect” in the context of alteration of riparian areas. One participant pointed out that there is a sequential order to follow: one must first identify and map critical areas (“science first”) before protection mechanisms are invoked. The National Fish Habitat Plan objectives include identification and mapping of areas critical to fish. Additionally, it is more cost-effective to prioritize habitat for protection. An alternative viewpoint is that currently no protections of riparian areas are in place in the Mat-Su borough⁴; thus, establishing a baseline of protection for all riparian areas would prevent impacts. At a later time, identification of critical areas would trigger higher levels of protection. Another argument that favored the sentiment to “protect first” is that some organizations are better equipped to establish protection mechanisms than to map, assess and prioritize areas critical to salmon.

⁴ A borough ordinance for waterbody setbacks is being revised and should improve baseline protections for riparian areas.

The group then discussed whether identification and mapping or restoration should occur first as a matter of addressing an impending threat. One example is Big Lake – it is identified as a Category IV concern so a pilot project should move forward now. An alternative view is that specific areas remain to be identified and mapped – for example, what habitats in Big Lake are of key concern? In regards to pilot projects, one participant noted that education is a desired component of restoration projects for some agencies. And, it is important to the success of a pilot project to receive public support.

A question arose about the concept of restoring altered riparian habitat – is restoration of riparian habitat possible? For example, water quality impacts would only occur if restoration is conducted over a large scale (e.g., watershed). In response to this question, one participant noted that in his experience, some restoration work plans include riparian restoration, but he is not aware of implementation. The group called for clarification of the objective to “restore altered riparian habitat”.

Overall, objective 2, “By 2015 protect at least 10% of priority riparian habitat” ranked highest, while objective 3, “By 2015 restore 5% of altered riparian habitat” ranked lowest in relative importance. The group agreed with the relative ranking of objectives 1 and 3, but there remained a philosophical disagreement among some of the group regarding the relationship between objective 1 (“identify and map”) and objective 2 (“protect”).

Because only one strategic action is under objective 1, no judgments of relative importance are needed.

In considering the relative importance of strategic actions under objective 2, local land use planning was favored. One participant questioned where “base” protection for riparian habitat is covered in the Plan as written? The response was that “base” protection is afforded through a combination of borough/private and state strategies. One person questioned the value of synthesizing existing riparian habitat protections? The response was that synthesis is necessary to protection – there is a sequential order to follow across a bigger picture of the basin. For example, without knowing who owns what, a conservation easement cannot be created. An alternative view was that synthesis of different types of protections on public and private lands is independent of protection itself – easements and acquisition can be initiated from existing information. On the subject of protecting state lands, skepticism was expressed about the state’s ability to protect their own lands without additional measures, such as applying FRPA standards. One participant argued that it is more cost effective to protect state lands than to acquire small parcels of private land in developed areas. There was discussion about the value of Best Management Practices (BMPs) – one person stated that placing easements on property will create greater benefits than relying on BMPs for protection of riparian habitat. An alternative view is that BMPs should be promoted as a means to fostering stewardship behavior. Under objective 2, the highest ranked strategic action is, “Support development of local land use planning”, followed by “Protect state lands with FRPA buffers and retention”. The strategic action, “Synthesize existing riparian habitat protections” received the lowest relative rank.

In considering the relative importance of strategic actions under objective 3, one participant pointed out that people are already implementing pilot projects on important streams, much has been learned, and benefits of these pilot projects (such as Willow Creek) are already apparent. Thus, maintaining existing pilot projects is more important than implementing more. An alternative view is that while both strategic actions under objective 3 are important, the implementation of more pilot projects will enable more people to understand the value of habitat. Under objective 3, the strategic action, “Implement pilot project” ranked slightly higher than “Conduct riparian restoration projects”.

Synthesis of priorities for all eight strategic actions resulted in a distribution of weights of importance (Figure 1b). Because “Support development of local land use planning” was the highest ranked strategic action under the highest ranked objective, it is not surprising to find that it is at the top. The three lowest ranked strategic actions are all quite similar in priority. There was no appreciable inconsistency in judgments relating to alteration of riparian areas.

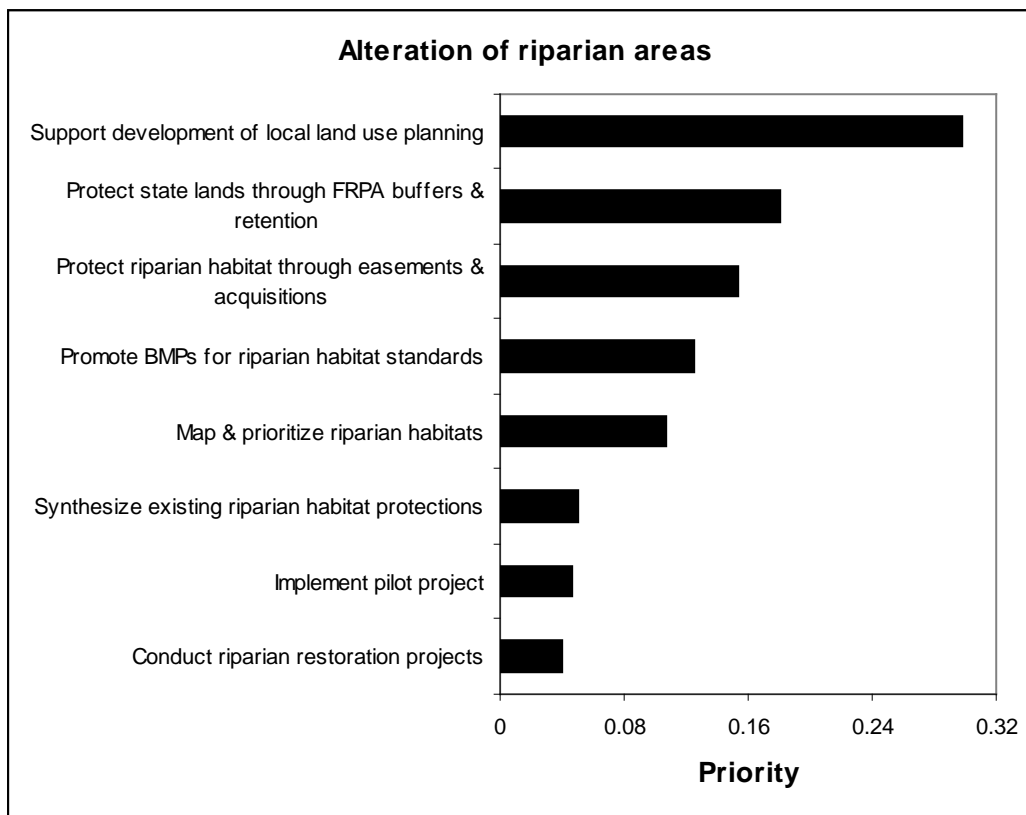


Figure 1b. The adjusted priority of strategic actions for the focal issue, alteration of riparian areas, Mat-Su Basin, 2008.

FOCAL ISSUE 2: FILLING OF WETLANDS

Participants had difficulty in assigning weights of importance to the original framework primarily because the strategic actions, “Map priority wetlands for salmon” and “Expand wetlands bank” appeared under two objectives (and were thus redundant). Additionally, strategic actions under the objective, “Local management” did not support the objective as written in the Plan. To address concerns voiced by several participants, concepts in this focal issue were clarified through revision of its organization - members of the Steering Committee eliminated the “Local management” objective and placed its strategic action, “Expand wetlands mitigation bank” under the objective of “No net loss”. Also, “Expand wetlands bank” was stricken from the strategic action, “Develop long term protection mechanisms”. The revision helped participants to understand intended concepts better, and the group then proceeded to assign weights of importance to strategic actions.

A total of eight elements comprise the revised framework in Figure 2a: one objective and seven strategic actions. The framework in Figure 2a is the end result of edits made during the workshop by members of the Steering Committee.

FOCAL ISSUE	OBJECTIVE	STRATEGIC ACTION
1.000 2. Filling of wetlands	1.000 1. By 2015 no net loss of wetlands important to salmon	0.089 1.1. Expand wetlands mitigation bank
		0.192 1.2. Protect wetlands with a short term moratorium on development
		0.231 1.3. Identify & map priority wetlands for salmon
		0.148 1.4. Protect wetlands through easements & acquisition
		0.047 1.5. Enhance degraded wetlands
		0.085 1.6. Strengthen review of 404 permits
		0.209 1.7. Develop long term protection mechanisms

Figure 2a. Framework of the focal issue, filling of wetlands, including unadjusted weights of importance.

Several participants voiced concern for the term, “No net loss”, because of low public acceptance for the term. Several alternatives to “No net loss” were suggested, such as “Loss will be minimized or mitigated”. However, others were dissatisfied with the implication of degraded wetlands. After consultation, members of the Steering Committee decided to retain the term, “No net loss” for an objective statement, and developed consistent wording with a similar objective in the focal issue, “Loss of estuarine and nearshore habitats”.

In examining the seven strategic actions for this focal issue, the group was in agreement for the most part, although differences of opinion surfaced in regards to the strategic action, “Strengthen review of 404 permits”. Some believed that the agency review process needed improvement, while others stated that “...agency personnel should do their job, we shouldn’t have to tell them to do their job.” There was also some disagreement in regards to the value of protecting wetlands through acquisition and easements versus regulation – regulation was deemed by some to be more cost-effective than easements and acquisition. The alternative viewpoint was that permanent protection

of wetlands through easements and acquisition would side step the uncertain outcome from agency review and regulation, and would be likely to have an immediate impact. Another cost-effective measure cited was the wetlands mitigation bank – it was thought to be more cost-effective than enhancing degraded wetlands.

Synthesis of priorities for all seven strategic actions resulted in a distribution of weights of importance (Figure 2b). The strategic action, “Identify and map priority wetlands for salmon” ranked the highest. There was no appreciable inconsistency in judgments relating to alteration of riparian areas.

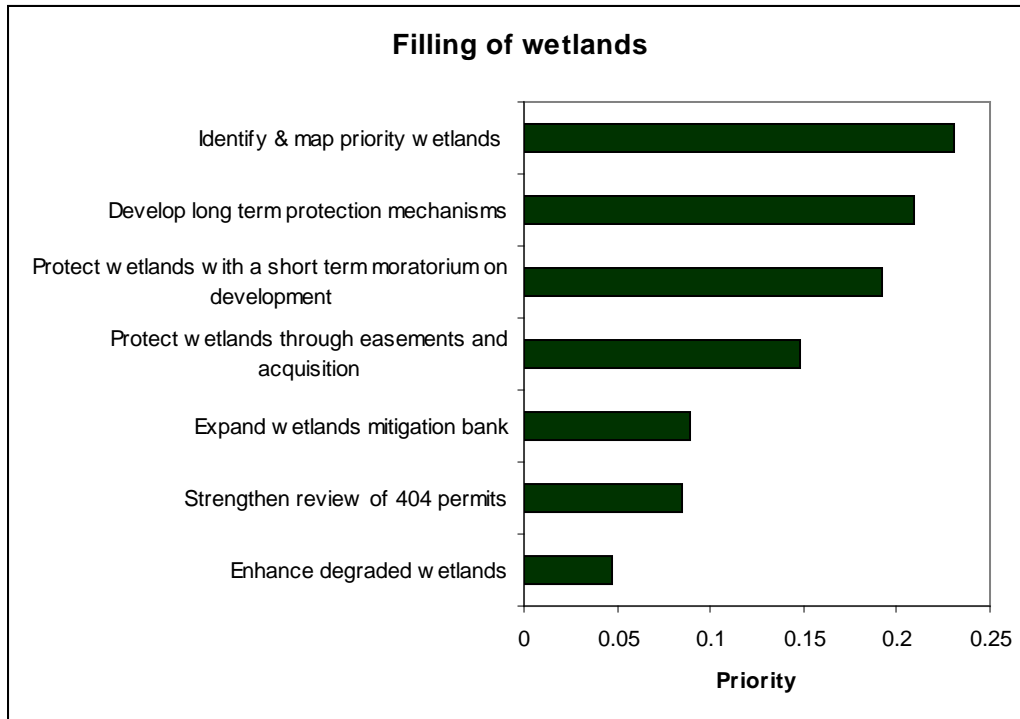


Figure 2b. The priority of strategic actions for the focal issue, filling of wetlands, Mat-Su Basin, 2008.

FOCAL ISSUE 3: IMPERVIOUS SURFACES AND STORMWATER RUNOFF

This focal issue has the largest number of elements (15): three objectives and 12 strategic actions (Figure 3a). Objective 1 (impact prevention) has five suggested strategic actions, compared to four and three strategic actions under objectives 2 (impact assessment) and 3 (water quality monitoring), respectively. Since the framework is imbalanced, the structural adjust feature in Expert Choice was used to restore priorities to their intended proportion of weight.

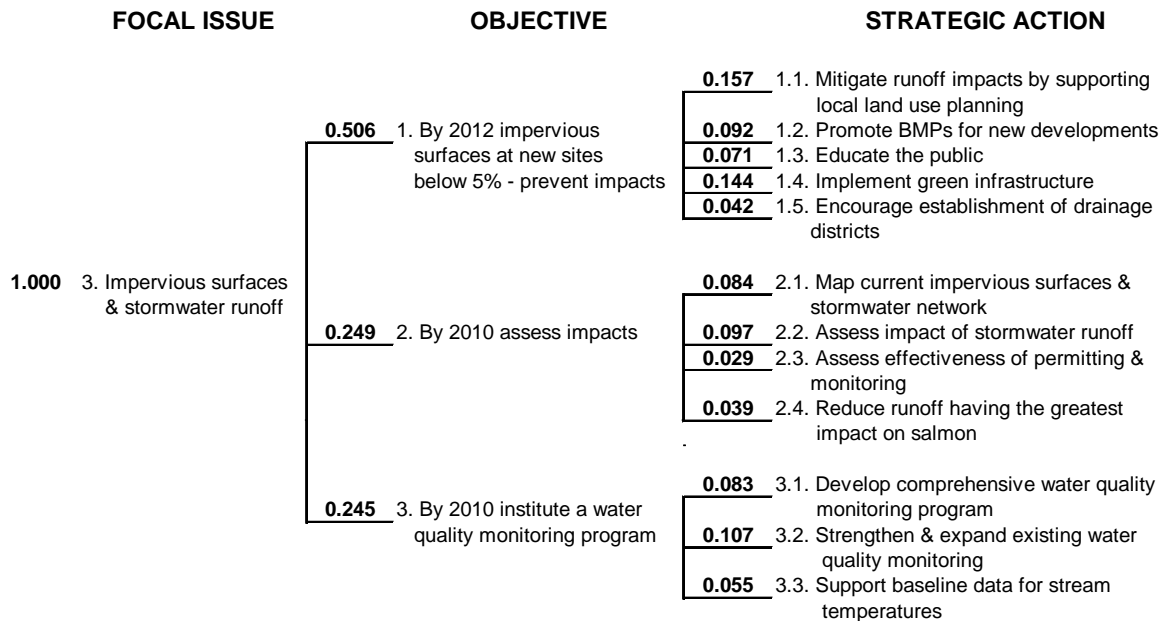


Figure 3a. Framework of the focal issue, impervious surfaces and stormwater runoff, including unadjusted weights of importance.

In considering the relative importance among objectives, the group discussed whether impact assessment or prevention should occur first in a sequence. Some participants favored assessment, because a better understanding of the situation is required before recommendations can be made. An alternative view is that while assessment is important, a sufficient amount of information is known regarding the problems with water quality and quantity to take action – the prudent first step to addressing impervious surfaces and stormwater runoff is to prevent impacts. When considering the importance of impact assessment and a water quality monitoring program, one participant noted that assessment might be best suited to individual projects and is thus less important than a large scale monitoring program. An alternative viewpoint is to consider that impact assessment is a short term (urgent) objective to map the current situation, and large scale monitoring is a long term objective. Following discussion, the group gave the highest rank of importance to impact prevention, while impact assessment and a water quality monitoring program were ranked nearly equal.

In considering the relative importance of strategic actions under objective 1, the group was in general agreement in allocating the highest rank to “Mitigate runoff impacts by supporting local land use planning”, followed by “Implement green infrastructure”.

In considering the relative importance of strategic actions under objective 2, it was argued that there is a need to know the effects of impervious surfaces and stormwater runoff on water quality, not where they occur. An alternative view is that mapping is needed to construct runoff models. It was pointed out that impervious surfaces have already been mapped; however, another participant noted that because impervious surfaces are continuously added, completed maps are problematic. In the end, the group was in agreement in assigning the highest rank under objective 2 to, “Assess impact of stormwater runoff”, with one dissenting vote. The second highest rank was assigned to, “Map current impervious surfaces and stormwater network”.

Under objective 3, a question arose as to why water temperature was singled out for measurement when so many other parameters can be measured? A strategic action for temperature monitoring was including into the Plan in support of Cook Inlet Keepers, who are seeking a large-scale assessment program; currently, water temperatures are approaching levels that can affect salmon survival. Following discussion, the highest ranked strategic action under objective 3 was, “Develop a comprehensive water quality monitoring program”.

Synthesis of priorities for all 12 strategic actions resulted in a distribution of weights of importance (Figure 3b). Since “Mitigate runoff impacts by supporting local land use planning”, and “Implement green infrastructure” were the highest ranked strategic actions under the highest ranked objective, it follows that they would rank high overall. There was no appreciable inconsistency in judgments relating to alteration of riparian areas.

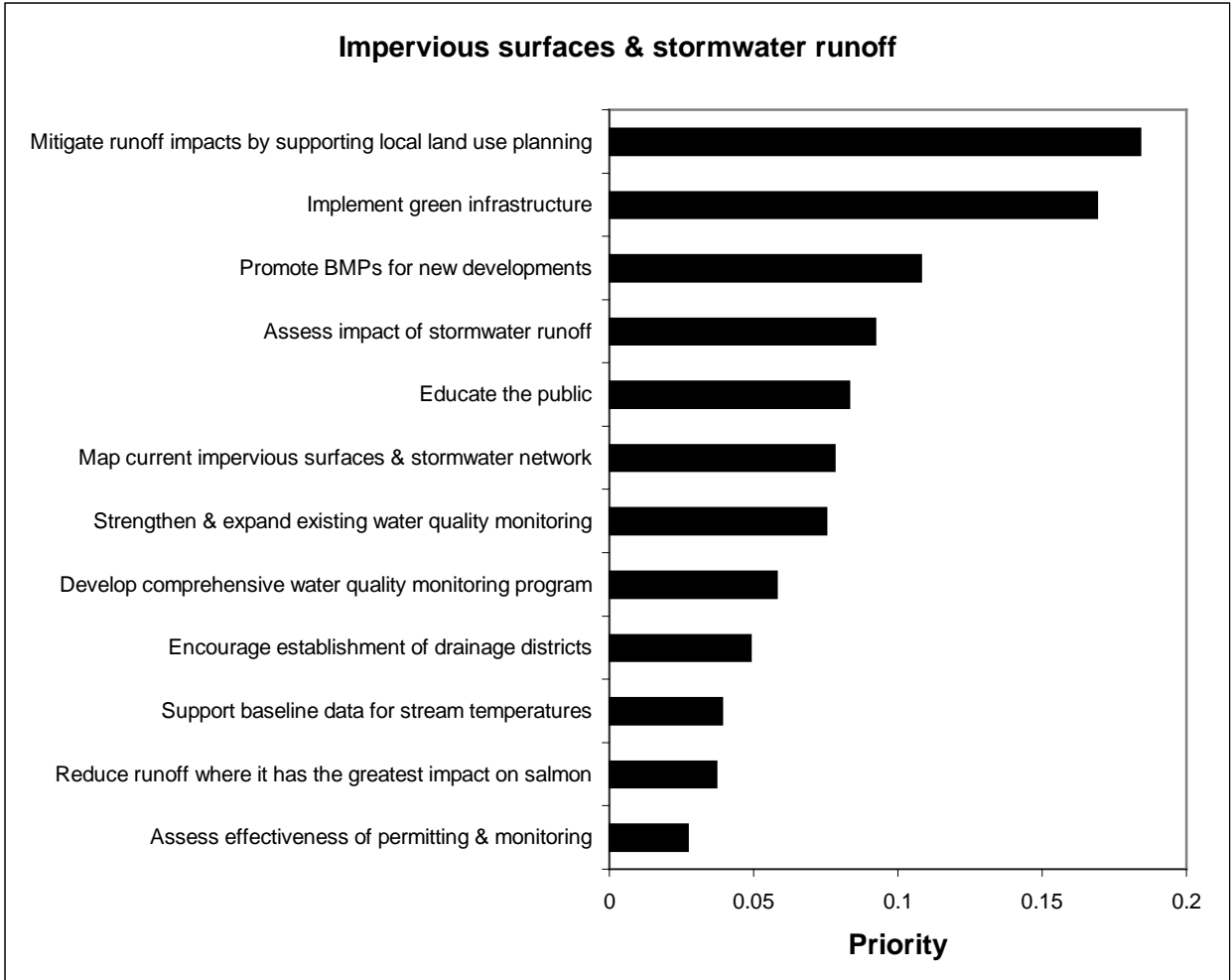


Figure 3b. The adjusted priority of strategic actions for the focal issue, impervious surfaces and stormwater runoff, Mat-Su Basin, 2008.

FOCAL ISSUE 4: SEPTIC SYSTEMS, AND LIMITED WASTEWATER COLLECTION AND TREATMENT

A total of six elements comprise the framework (Figure 4a): two objectives and four strategic actions. Objective 1 has three strategic actions, compared to objective 2, with just one strategic action. Since the framework is imbalanced, the structural adjust feature in Expert Choice was used to restore priorities to their intended proportion of weight.

FOCAL ISSUE	OBJECTIVE	STRATEGIC ACTION
1.000 4. Septic systems, limited wastewater collection & treatment	0.681 1. Prevent impairment of water quality from onsite septic systems	0.217 1.1. Encourage installation of community septic systems
	0.319 2. By 2015 the MSB has a wastewater treatment facility	0.245 1.2. Identify & map areas of poor suitability
		0.218 1.3. Tie septic suitability to land use permits
		0.319 2.1. Encourage construction of wastewater treatment facility

Figure 4a. Framework of the focal issue, septic systems, limited wastewater collection and treatment, including unadjusted weights of importance.

The group engaged in a great deal of discussion about the disposal of waste generated by Mat-Su basin residents. Several participants shared their knowledge of this focal issue with the remainder of the group prior to decision-making, so all participants came away from the discussion with greater awareness of the problems associated with septic systems in the Mat-Su basin. Currently, there is very limited collection of wastewater in the Mat-Su Basin and the small amount that is collected is trucked to a treatment facility in Anchorage where it undergoes only primary treatment before discharge into Knik Arm. There are actually two components to this focal issue: the majority of Mat-Su Basin residents dispose of waste using septic systems or an outhouse; and, the limited waste that is collected is trucked to Anchorage where treatment is believed by some at the workshop to be inadequate.

Following this explanation of the focal issue, one participant asked, “Why do we care where waste goes?” – the answer entails perceived inadequate treatment of the waste and resulting water quality concerns in Cook Inlet. The Anchorage facility has an exemption from the National Pollutant Discharge Elimination System to use only primary treatment of wastewater before discharge into Knik Arm. A participant argued that the more critical component of this issue for the Mat-Su Basin is the inadequacy of on-site septic systems and outhouses.

As a result of discussion, the group proposed the following word changes to objective 1: “Prevent impairment of water quality from on-site septic systems”. The current wording of objective 1, “Community septic systems” is misleading, because strategic actions under this objective speak to onsite septic systems, not community septic systems. Thus, to avoid confusion, the group advises replacing “community” with the above wording change.

Additionally, objective 2 should be clarified to allow for expansion and replacement of inadequate sewer systems.

The group weighted the objective, “Prevent impairment of water quality from on-site septic systems” much higher than the objective, “By 2015 the Mat-Su Borough has a wastewater treatment facility” because preventing impairment of water quality from onsite septic systems addresses a pervasive threat.

Under the objective, “Prevent impairment of water quality from on-site septic systems” the group slightly favored the mapping of areas that are poorly suited to onsite septic systems to the other two strategic actions in this node. Mapping of areas unsuitable for building would be provided to the general public and regulators. Slightly less weight was given to the strategic action, “Encourage installation of community septic systems” – this promotes the installation of community water wells and septic systems through BMPs, incentives, education and regulation. The weight given to “Encourage community septic systems” was tied with the strategic action, “Tie septic suitability to land use permits”, despite the argument that providing information to the general public about areas that are poorly suited to septic systems is insufficient, because some developers would build regardless of soil suitability.

Synthesis of all four strategic actions resulted in a distribution of weights of importance (Figure 4b), where “Identify and map areas of poor septic suitability” ranked highest. There was no appreciable inconsistency in judgments relating to septic systems, limited wastewater collection and treatment.

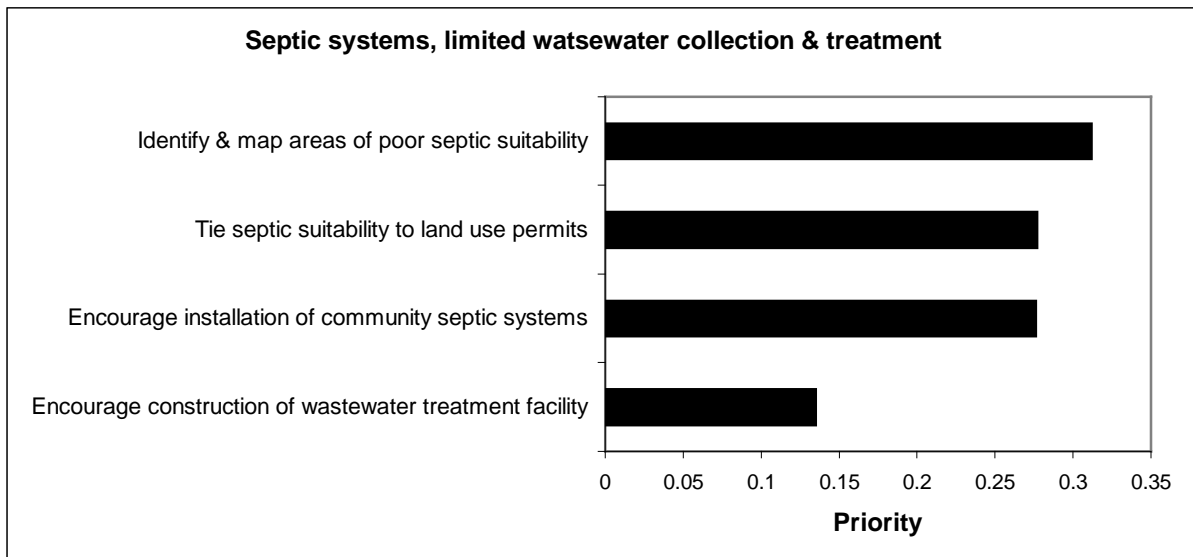


Figure 4b. The adjusted priority of strategic actions for the focal issue septic systems, limited wastewater collection and treatment, Mat-Su Basin, 2008.

FOCAL ISSUE 5: CULVERTS THAT BLOCK FISH PASSAGE

A total of 11 elements comprise the framework (Figure 5a): two objectives and 9 strategic actions. Objective 1 has six strategic actions, and objective 2 with three strategic actions. Since the framework is imbalanced, the structural adjust feature in Expert Choice was used to restore priorities to their intended proportion of weight.

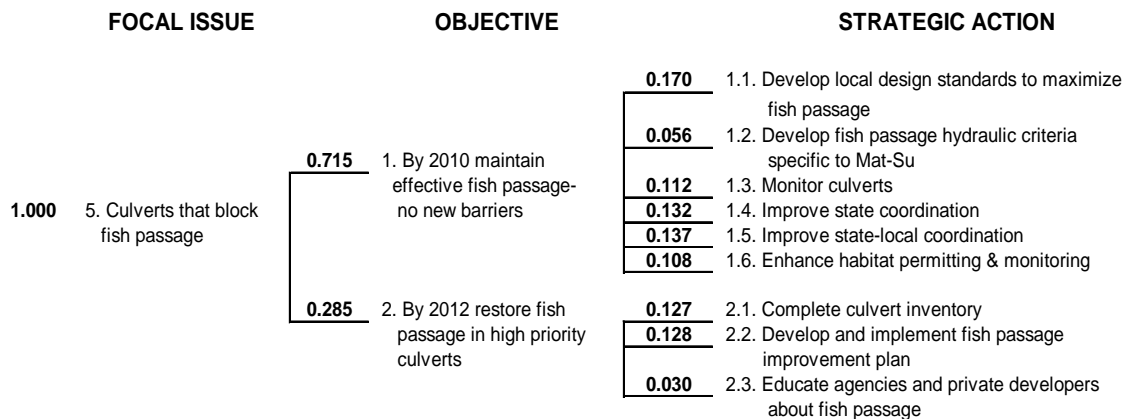


Figure 5a. Framework of the focal issue, culverts that block fish passage, including unadjusted weights of importance.

In considering the relative importance among objectives, the group discussed the status of the catalog. Many anadromous waters of the Mat-Su Basin still remain to be mapped and included in the catalog. Most of the group thought that inclusion of waters in the catalog was needed to ensure “no new barriers”. One participant thought that inclusion of anadromous waters in the catalog might lead to better culvert designs. As the group struggled with comparing the relative importance of the catalog to its two sister objectives, it became apparent that the concepts were at different orders of magnitude, or as one participant explained, it was like comparing “apples and oranges”. If a stream is anadromous, many issues come into play, not just culvert designs. At the urging of several participants, the Steering Committee eliminated the catalog as an objective, and raised the catalog to a focal issue.

Overall, objective 1, “By 2010 maintain effective fish passage-no new barriers” was rated the most important. In considering the relative importance of strategic actions under objective 2, questions arose about “hydraulic criteria”. The intent of the strategic action, “Develop fish passage hydraulic criteria specific to the Mat-Su” is to develop basin-specific criteria for fish passage from data collected in surface quantity studies. In reality, “average” watershed values are used and are associated with large errors. Another disadvantage to this strategic action as written is that differences in flows do not necessarily coincide with differences in localized velocities that actually determine fish passage. In discussing local culvert design standards, the question arose as to whether or not new culvert installations are consistent with fish passage; and further, whether culverts are installed as designed? While monitoring allows for analysis of local design

standards, monitoring is not necessarily conducted. One participant argued that it is important to mimic natural streams in culverts, and hydraulic models should not be used because they are prone to errors (don't work). Improving coordination within state agencies and between the state and local organizations were generally agreed to be important to achieving the objective of "no net loss". There was general agreement among the group in ranking the strategic action, "Develop local design standards to maximize fish passage" as most important, followed by the strategic actions to improve coordination among agencies.

In considering the relative importance of strategic actions under objective 2, it was noted that while the objective is about replacing culverts, no strategic action is identified to do so. To correct this omission, a participant suggested to include the words "and implement" in the strategic action, "Develop and implement a fish passage improvement plan". In regards to the strategic action calling for a complete culvert inventory, one participant shared that the majority of culverts in the Mat-Su Basin have been assessed, and future surveys are planned in cooperation with the Alaska Railroad. A question arose as to whether the status of "gray" culverts will change as assessment of culverts is completed? The response was that about a third of the culverts will be assessed as "gray" and treated as potential barriers. Overall, the group assigned similarly high ratings of importance to two strategic actions, "Complete culvert inventory" and "Develop and implement a fish passage improvement plan"

Synthesis of priorities for all nine strategic actions resulted in a distribution of weights of importance (Figure 5b). Because "Develop local design standards to maximize fish passage" was the highest ranked strategic action under the highest ranked objective, it is at the top. There was no appreciable inconsistency in judgments relating to culverts that block fish passage.

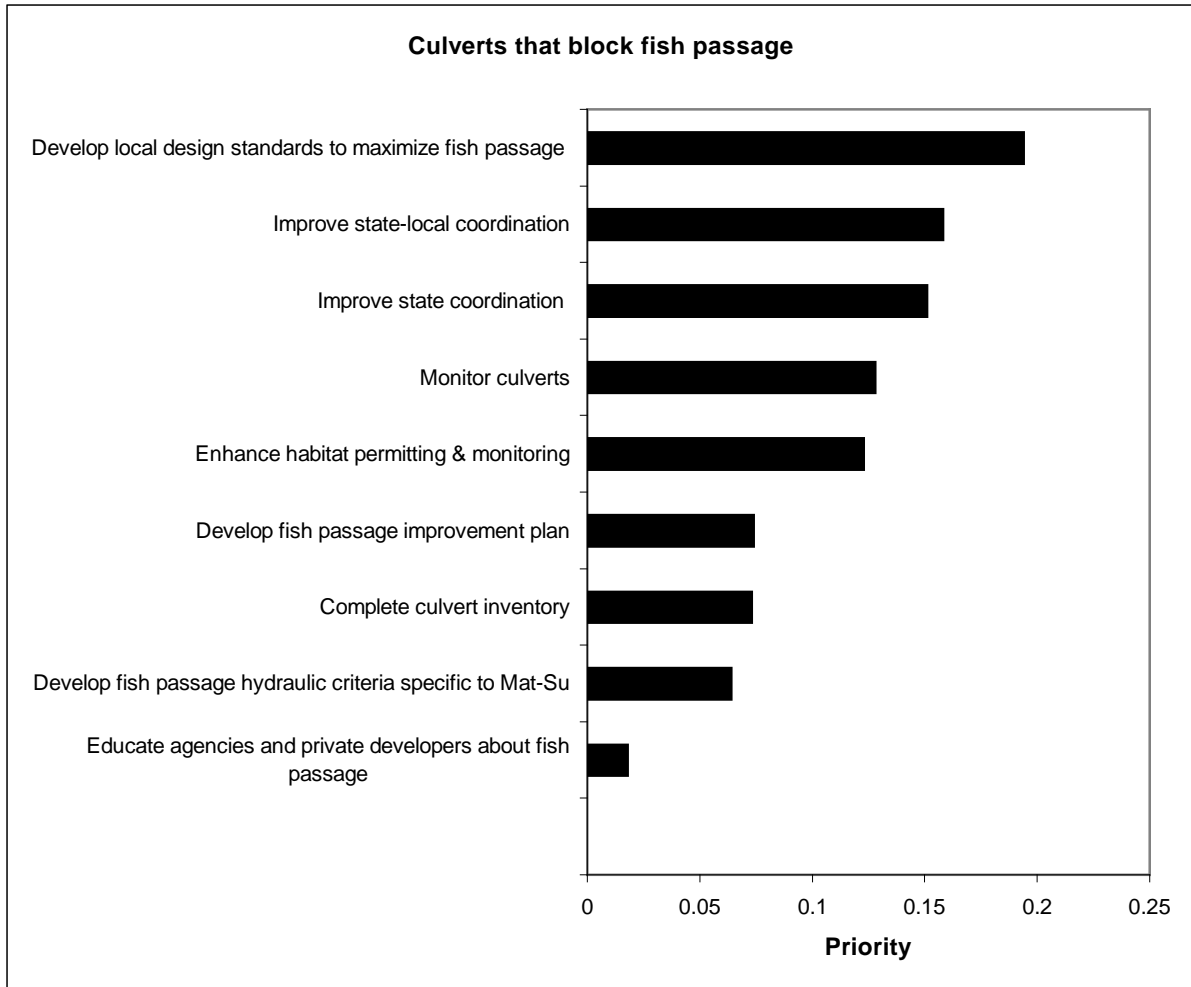


Figure 5b. The adjusted priority of strategic actions for the focal issue, culverts that block fish passage, Mat-Su Basin, 2008.

FOCAL ISSUE 6: LOSS OF WATER FLOW OR VOLUME

A total of 12 elements comprise the framework (Figure 6a): three objectives and nine strategic actions. Objective 1 has four strategic actions, compared to objective 2, with three, and objective 3 with two strategic actions. Since the framework is imbalanced, the structural adjust feature in Expert Choice was used to restore priorities to their intended proportion of weight.

FOCAL ISSUE	OBJECTIVE	STRATEGIC ACTION
1.000 6. Loss of water flow or volume	0.643 1. By 2020 file instream flow on highest priority anadromous waters	0.255 1.1. Prioritize anadromous streams & lakes
		0.156 1.2. Establish Mat-Su basin instream flow program
		0.130 1.3. File instream flow reservations
		0.101 1.4. Evaluate water withdrawal laws & practices
	0.310 2. By 2012 conduct comprehensive surface & groundwater studies	0.148 2.1. Implement study plan & water data clearinghouse
		0.068 2.2. Support USGS groundwater program
		0.094 2.3. Collect hydrologic data
	0.047 3. By 2012 assess current & future community water needs	0.027 3.1. Monitor groundwater use
		0.020 3.2. Estimate future water needs & potential conflicts

Figure 6a. Framework of the focal issue, loss of water flow or volume, including unadjusted weights of importance.

In examining the relative importance among objectives, the group weighted the objective, “By 2020 file instream flow on highest priority anadromous waters” much higher than the objectives, “By 2012 conduct comprehensive surface and groundwater studies” and “By 2012 assess current and future community water needs” because as one participant stated, “Without water in streams you won’t have fish.”

Under the objective, “By 2020 file instream flow on highest priority anadromous waters” the group discussed the importance of filing for instream flow reservations versus prioritizing anadromous streams and lakes for reservations. The arguments that slightly prevailed were: prioritizing which waters to file for reservations should sequentially occur before the actual filing; and, the entire instream flow reservation process is lengthy and a huge amount of work. Establishing a Mat-Su Basin instream flow program received slightly more weight than actual filing for reservations because the program is intended to create a more cost-effective instream flow reservation process.

Under the objective, “By 2012 conduct comprehensive surface and groundwater studies”, a lively discussion ensued regarding the merits of the strategic actions to “Implement a study plan and water data clearinghouse” versus “Collect hydrologic data”. One participant maintained that collecting data is important to support instream flow reservations, while another participant noted that a clearinghouse is needed first so that “there is a place to put the data”. Overall, the group slightly favored the development of a clearinghouse by winter of 2008 to manage data collected for surface and ground water

studies over the collection of hydrologic data with stream gauges in three to five index watersheds important to salmon.

Under the objective, “By 2012 assess current and future community water needs” the two strategic actions to “Monitor groundwater use” and “Estimate future needs and potential conflicts” received nearly equal weights of importance.

Synthesis of all nine strategic actions resulted in a distribution of weights of importance (Figure 6b), where “Prioritize anadromous streams and lakes” is at the top. There was no appreciable inconsistency in judgments relating to loss of water flow or volume.

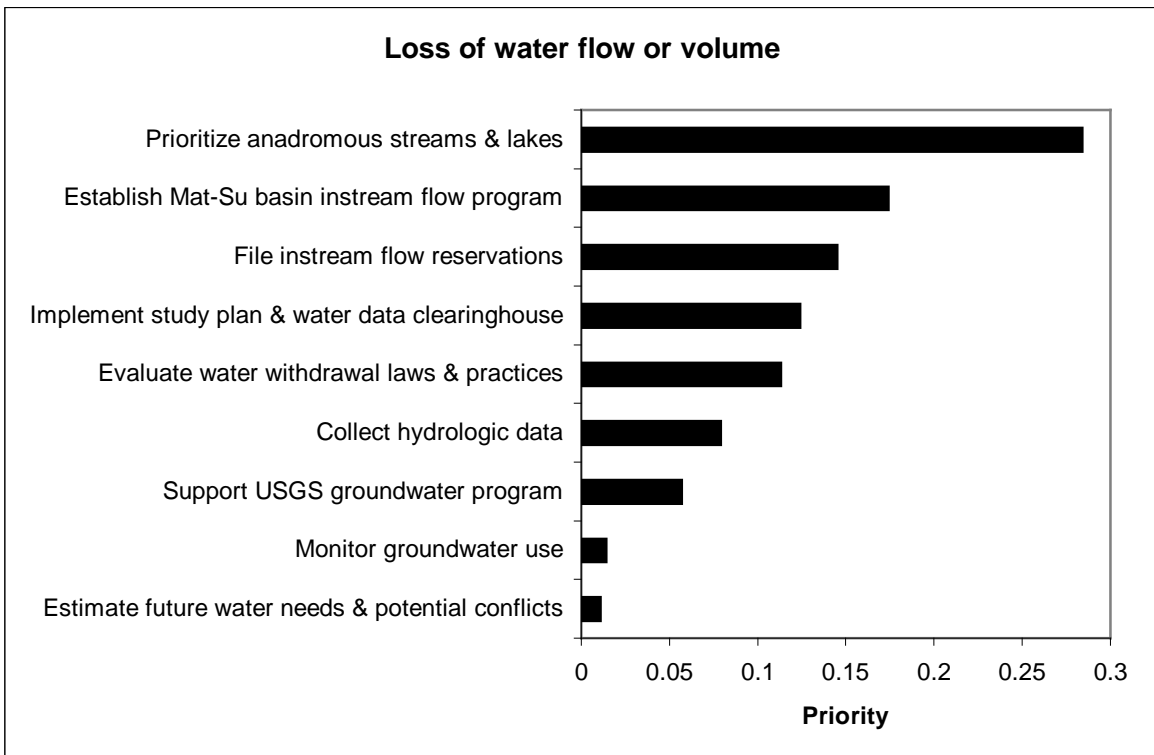


Figure 6b. The adjusted priority of strategic actions for the focal issue, loss of water flow or volume, Mat-Su Basin, 2008.

FOCAL ISSUE 7: LOSS OF ESTUARIES AND NEARSHORE HABITAT

A total of 10 elements comprise the framework (Figure 7a): two objectives and eight strategic actions. Because each objective has four strategic actions, the framework is balanced and no adjustment is needed.

FOCAL ISSUE	OBJECTIVE	STRATEGIC ACTION
1.000 7. Loss of estuaries & nearshore habitats	0.614 1. By 2012 understand salmon use of Cook Inlet	0.214 1.1. Map habitat types
		0.123 1.2. Map salmon movements
		0.081 1.3. Study salmon interactions
		0.197 1.4. Map critical habitats for salmon
	0.386 2. By 2015 minimize loss of habitats important to salmon	0.148 2.1. Create Cook Inlet alliance
		0.075 2.2. Plan regionally for marine transportation infrastructure
		0.064 2.3. Improve management and construction of coastal facilities
		0.009 2.4. Improve water quality

Figure 7a. Framework of the focal issue, loss of estuaries and nearshore habitats, including unadjusted weights of importance.

In examining the relative importance among objectives, the group weighted the objective, “By 2012 understand salmon use of Cook Inlet ” much higher than the objective to “By 2015 minimize loss of habitats important to salmon – no net loss” because obtaining knowledge about salmon residence and movements by life stage in Cook Inlet would reduce uncertainty and data gaps. Additionally, minimizing loss of areas important to salmon cannot occur before the important areas are first identified.

In considering the importance of strategic actions under objective 1, participants were assured that mapping habitat important to salmon can occur independently of mapping salmon movements. The group favored the mapping of habitat over the mapping of salmon movements because there is rationale for a sequential order: there is a need to develop physical classification first, then observe what habitat types are used by fish. The Upper Cook Inlet shoreline has been mapped and delineated in regards to areas potentially vulnerable to oil spills, however further ecological detail would enhance the research design and interpretation regarding studies on salmon distribution. Research on how salmon interact with the chemical and physical processes of Cook Inlet would follow understanding habitat and movements. Additionally, research on how oceanographic processes affect salmon can be costly and challenging.

In considering strategic actions under objective 2, several participants argued that the creation of a Cook Inlet Alliance is the best method for minimizing loss of marine habitat important to salmon because, in part, the National Fish Habitat Board emphasizes the examination of regions through large partnerships (alliances). Partnerships can foster greater sharing of information and cooperation towards commonly perceived goals. In a sequential sense, once a partnership is formed, the remaining strategic actions – to plan

regionally, improve construction techniques, and improve water quality – will fall into place because there will be more ownership by the partners in a successful outcome. An alternative viewpoint argued by some participants is that reducing or eliminating non-point pollution discharge seems cost-effective (easy) and effective. Overall, however, the group assigned the greatest weight of importance to creating a Cook Inlet Alliance.

Synthesis of all eight strategic actions resulted in a distribution of weights of importance (Figure 7b), where “Map habitat types” and “Map critical habitats for salmon” are both highly important strategic actions. There was no appreciable inconsistency in judgments relating to loss of estuaries and nearshore habitats.

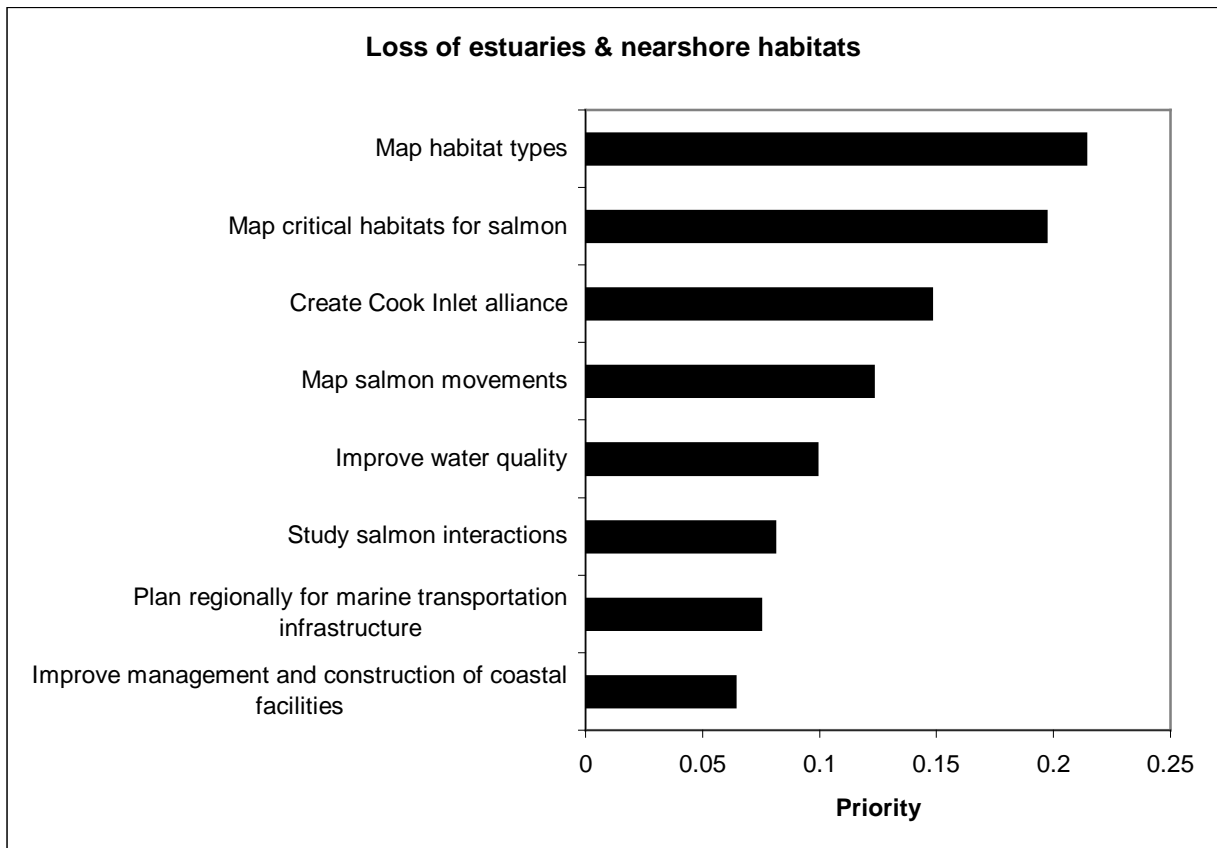


Figure 7b. The adjusted priority of strategic actions for the focal issue, loss of estuaries and nearshore habitats, Mat-Su Basin, 2008.

FOCAL ISSUE 8: INVASIVE NORTHERN PIKE

This is the smallest framework, with only five elements (Figure 8a): two objectives and three strategic actions. Because objective 2 has only one strategic action, the framework is imbalanced, the structural adjust feature in Expert Choice was used to restore priorities to their intended proportion of weight.

FOCAL ISSUE	OBJECTIVE	STRATEGIC ACTION
1.000 8. Invasive northern pike	0.381 1. By 2010 understand pathways of invasion to predict & prevent more	0.224 1.1. Research invasion pathways
		0.157 1.2. Implement control where salmon are most vulnerable
	0.619 2. By 2012 reduce public introductions through education & outreach	0.619 2.1. Develop public education & outreach program

Figure 8a. Framework of the focal issue, invasive northern pike, including unadjusted weights of importance.

In considering the relative importance among objectives, the group weighted the objective, “By 2012 reduce public introductions through education and outreach” much higher than the objective, “By 2010 understand pathways of invasion to predict and prevent additional introductions” because biologists with the ADFG, Sport Fish Division have come to the conclusion that open water systems in the Mat-Su Basin create tremendous difficulties in predicting and preventing movements of northern pike. In fact, the biologists believe that the only mechanism to quell the invasion of northern pike into further water bodies in the basin is through public education and outreach. Additionally, little is known about the efficacy of pathways analysis. The strategic action to “Research invasion pathways” received slight favor over the strategic action to “Implement control where salmon are most vulnerable”, due in part to skepticism regarding efforts to control northern pike populations – it may be more effective to estimate potential areas of introductions and attempt to forestall introductions through public education and outreach, than to control northern pike populations once they are established. The group’s priorities aligned with ADFG’s “Management Plan for Invasive Northern Pike in Alaska”.

Synthesis of all three strategic actions resulted in a distribution of weights of importance (Figure 8b), where “Develop a public education and outreach program” is at the top. There was no appreciable inconsistency in judgments relating to invasive northern pike.

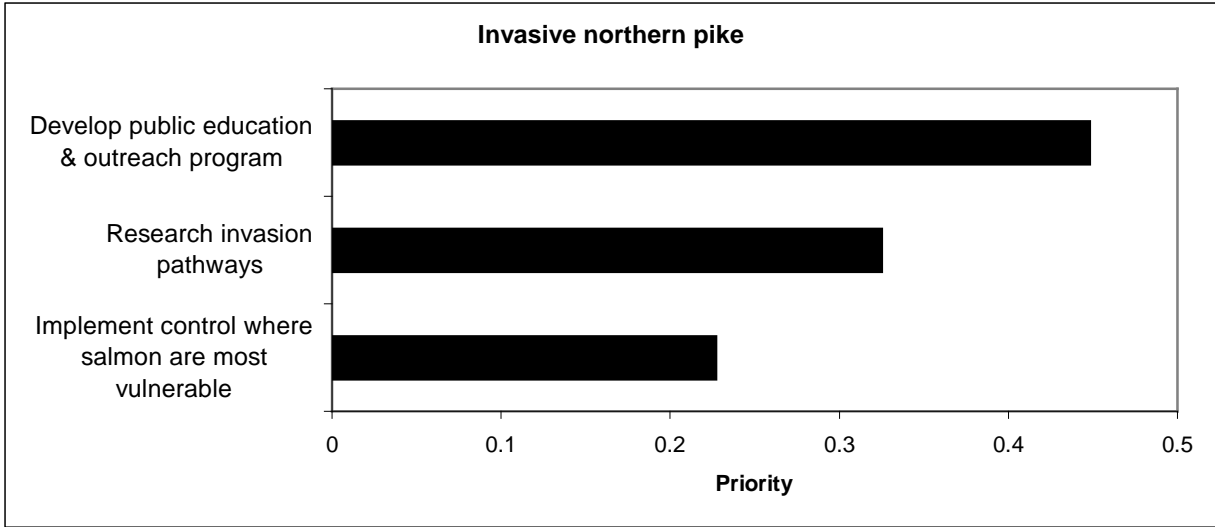


Figure 8b. The adjusted priority of strategic actions for the focal issue, invasive northern pike, Mat-Su Basin, 2008.

CONCLUSIONS

Prioritization of the Plan was successfully completed with the participation of regional professionals and interested persons of varying expertise and management responsibility across the eight focal issues. Not all who were invited were able to attend the workshop. However, there appeared to be sufficient diverse expertise and experience to stimulate discussion, address divergent viewpoints, and create a reasonable ranking of strategic actions. Prioritized strategic actions will provide partners with guidance for salmon habitat conservation activities in the Mat-Su Basin, and will assist in the prioritization of projects for funding through the National Fish Habitat Action Plan and other funding that comes to the Partnership. Additional benefits from the workshop included increased knowledge and awareness of concerns for salmon habitat in the Mat-Su Basin fostered through facilitated discussions between participants, and, learning about a systematic approach to planning and problem-solving.

AHP's principle application is for judgmental problems in which subjective criteria play a dominant role, and has several advantageous attributes that are useful for planning processes:

- establishes a framework for defining issues and identifying options that is easily understood and communicated to others;
- facilitates simultaneous consideration of multiple criteria;
- encourages participants to formally represent their understanding of the concept;
- promotes discussion that fosters understanding and clarity of varying viewpoints;
- incorporates conflicting opinions of multiple stakeholders into a group decision of prioritized concepts;
- provides the ability to review the reasoning behind a decision;
- provides an indication of the extent and relative intensity of opposition to, or agreement with, varying concepts; and,
- ease of updating as new information becomes available.

As the group applied the AHP to the Conservation Strategies of the Plan, the necessity of assigning weights of importance helped participants maintain cohesive thought patterns in regards to concepts, thereby increasing the effectiveness of thinking. In addition to offering priorities, participants also suggested several word and organizational changes intended to refine and clarify Conservation Strategies.

LITERATURE CITED

- KRSA. 2005. Strategic plan for focusing Pacific Coastal Salmon Recovery Program funds on priority habitat and fisheries concerns in the Kenai River watershed. Kenai River Sportfishing Association. PO Box 1228 Soldotna, Alaska 99669
- KRSA. 2006. Strategic plan for focusing Pacific Coastal Salmon Recovery Program funds on priority habitat and fisheries concerns in the Kenai River watershed. Kenai River Sportfishing Association. PO Box 1228 Soldotna, Alaska 99669
- KRSA. 2007. Strategic plan for focusing Pacific Coastal Salmon Recovery Program funds on priority habitat and fisheries concerns in the Kenai River watershed. Kenai River Sportfishing Association. PO Box 1228 Soldotna, Alaska 99669
- Merritt, M. and K. Criddle. 1993. Evaluation of the Analytic Hierarchy Process for aiding management decisions in recreational fisheries: a case study of the Chinook salmon fishery in the Kenai River, Alaska. Proceedings of the International Symposium on Management Strategies for Exploited Fish Populations, Alaska Sea Grant Program, AK-93-02, pp 683-703.
- Merritt, M. 1995. Application of decision analysis in the evaluation of recreational fishery management problems. Ph.D. dissertation. University of Alaska Fairbanks.
- Merritt, M. F. 2000. Strategic plan for chinook salmon research in the Copper River drainage. ADFG Special Publication No. 00-03, Anchorage. www.sf.adfg.ak.us/statewide/divreports/html/dsp_Simple_Search.cfm & type in "Merritt"
- Merritt, M. 2001. Strategic plan for salmon research in the Kuskokwim River drainage. ADFG, Fishery Special Publication No. 01-07, Anchorage. www.sf.adfg.ak.us/statewide/divreports/html/dsp_Simple_Search.cfm & type in "Merritt"
- Merritt, M. and A. Skilbred. 2002. Planning for sustainable salmon in Southeast Alaska, and prioritization of projects for the Southeast Sustainable Salmon Fund, 2001. ADFG, Fishery Special Publication No. 02-01, Anchorage. www.sf.adfg.ak.us/statewide/divreports/html/dsp_Simple_Search.cfm & type in "Merritt"
- Saaty, T. 1999. Third edition. Decision making for leaders: the analytic hierarchy process for decisions in a complex world. RWS Publications. Pittsburgh, Pennsylvania.
- Saaty, T. and K. Kearns. 1985. Analytical planning: the organization of systems. RWS Publications, Pittsburgh, Pennsylvania.
- SSLMC. 2007. Multi-criteria decision tool to evaluate proposals for change in Steller sea lion protection measures in the Gulf of Alaska and Bering Sea/Aleutian Islands groundfish fisheries, 2006. Report from the Steller Sea Lion Mitigation Committee to the Science and Statistical Committee, North Pacific Fisheries Management Council. www.fakr.noaa.gov/npfmc/current_issues/ssl/SSLMCranktool806.pdf

LITERATURE CITED CONTINUED

- USFWS. 2006a. Strategic plan for the subsistence fisheries resource monitoring program, southeast region, 2006. Office of Subsistence Management, 3601 C St. Suite 1030, Anchorage, Alaska. 99503 www.r7.fws.gov/asm/strategic.cfm
- USFWS. 2006b. Strategic plan for the subsistence fisheries resource monitoring program, Kodiak/Aleutians area, 2006. Office of Subsistence Management, 3601 C St. Suite 1030, Anchorage, Alaska. 99503 www.r7.fws.gov/asm/strategic.cfm
- USFWS. 2006c. Strategic plan for the subsistence fisheries resource monitoring program, Bristol Bay-Chignik region, 2005. Office of Subsistence Management, 3601 C St. Suite 1030, Anchorage, Alaska. 99503 www.r7.fws.gov/asm/strategic.cfm
- USFWS. 2005. Strategic plan for the subsistence fisheries resource monitoring program, southcentral region, 2004. Office of Subsistence Management, 3601 C St. Suite 1030, Anchorage, Alaska. 99503 www.r7.fws.gov/asm/strategic.cfm

Appendix A. The Steering Committee of the Mat-Su Basin Salmon Habitat Partnership.

Organization	Name	E-mail
US Fish & Wildlife Service	John DeLapp	john_delapp@fws.gov
National Marine Fisheries Service	Jeanne Hanson	jeanne.hanson@noaa.gov
ADFG-Sport Fish Div	Tom Brookover	tom.brookover@alaska.gov
Mat-Su Borough	Frankie Barker	fbarker@matsugov.us
The Nature Conservancy	Corinne Smith	corinne_smith@tnc.org
Friends of Mat-Su	Kathy Wells	foms@mtaonline.net
Chickaloon Village Traditional Council	Jessica Dryden	jessica@chickaloon.org

Appendix B. Participants in the prioritization workshop, Mat-Su Basin salmon conservation strategic action plan, Wasilla, May 21, 2008.

Organization	Name	E-mail
US Fish & Wildlife Service	Doug McBride	doug_mcbride@fws.gov
National Marine Fisheries Service	Jeanne Hanson	jeanne.hanson@noaa.gov
Army Corps of Engineers	Chelan Schreifels	chelan.j.schreifels@usace.army.mil
Environmental Protection Agency	Matt LaCroix	lacroix.matthew@epa.gov
NRCS	Chet Fitzgerald	Chet.Fitzgerald@ak.usda.gov
ADFG-Sport Fish Div	Cecil Rich	cecil.rich@alaska.gov
Ak Dept. Environmental Conservation ^a		
Ak Dept. of Transportation & Public Facilities ^a		
Ak Dept. Natural Resources ^a		
Mat-Su Borough	Frankie Barker	fbarker@matsugov.us
The Nature Conservancy	Corinne Smith	corinne_smith@tnc.org
Friends of Mat-Su	Kathy Wells	foms@mtaonline.net
Greatland Trust	Dave Mitchell	davidm@greatlandtrust.org
Soil and Water Conservation District	Catherine Inman	catherine@wasillaswcd.org
Chickaloon Village Traditional Council	Jessica Dryden	jessica@chickaloon.org
Mat-Su Valley resident	Larry Engel	larryengel@gci.net
Cook Inlet Aquaculture Assoc.	Gary Fandrei	gfandrei@ciaanet.org
ARRI	Jeff and Gay Davis	arri@mtaonline.net

^a Representatives from these organizations were unable to attend the workshop.

Support Staff:

Chair	Tom Brookover	267-2150	tom.brookover@alaska.gov
Facilitator	Peggy Merritt	457-5911	pmerritt@ak.net
Computer driver	Beth Spangler	786-3325	beth_spangler@fws.gov
Note taker	Jeff Anderson		jeffry_anderson@fws.gov