Section 5
Action Plan

5.1 Overview of Potential Actions

The impact assessment documented in Section 4 considered a variety of potential impacts of agricultural activities and infrastructure on water quantity, water quality, and listed species and habitat. This section describes potential actions for minimizing these impacts. A variety of actions are described in this section; the agricultural community will further investigate the feasibility of these actions and select specific actions for implementation in the process of negotiating with federal and state agencies during Step 10 (Interagency Agreements) of the CIDMP process.

Table 5-1 lists the various potential actions, which are organized in the following categories:

- ***Facility Improvements*** – physical upgrades, construction, replacement, or removal of facilities such as irrigation equipment, diversion structures, fish screens, etc.
- ***Operational Changes*** – adjustments to operations, practices, or schedules designed to meet identified needs.
- ***Policy Changes*** – adjustments to district policies or existing agreements with regulatory entities or other stakeholders.
- ***Information Collection and Monitoring Programs*** – projects and programs to fill data gaps, provide a better understanding of district activities and impacts, and document improvements resulting from the implementation of actions by the districts.

Actions listed in Table 5-1 are linked to three areas of concern addressed in this CIDMP document: water quantity, water quality, and listed species and habitat. Each potential action addresses one primary area of concern, and may also have secondary benefits to other areas. The table also indicates whether the districts have the authority and/or resources to implement the action alone, or whether partnerships with other entities would be necessary for implementation. In general, it is assumed that most actions will require partnerships with other organizations to provide technical and/or financial assistance for implementation.

Each of the potential actions listed in Table 5-1 are described in detail below.

Table 5-1. Overview of Potential Actions

Action	Areas Addressed by Action			Can Districts Implement Alone?
	Water Quantity	Water Quality	Listed Species	
Facility Improvements				
Improve irrigation efficiency	X	●	●	No
Water storage	X	●	●	No
Install, repair, or upgrade fish screens			X	No
Improve or provide fish passage			X	No
Restore riparian areas		●	X	No
Minimize bank armoring			X	Yes
Reduce diversions from small watercourses	●		X	No
Operational Changes				
Conversion from surface to groundwater	X	●	●	No
Imported water	X	●	●	No
Reclaimed water	X	●	●	No
Irrigation scheduling	X	●	●	No
Implement BMPs		X	●	Yes
Improve riparian buffer quality		X	●	Yes
Reduce pesticide use		X	●	Yes
Improve intertidal habitat			X	No
Policy Changes				
Change water rights	X	●	●	No
New water rights	X	●	●	No
District Capital Improvement Plan (CIP)	●	●	●	Yes
Public education and outreach program	●	X	●	Yes
Information Collection and Monitoring Programs				
Irrigation flow monitoring	X	●	●	Yes
Groundwater-Surface Water Connectivity Study	X	●	●	No
Samish fecal coliform TMDL		X	●	No
Water quality monitoring		X	●	No
Drainage flow monitoring	●	X	●	Yes
Fish screen and fish passage inventory			X	Yes

X = Primary area of concern; ● = Secondary area of concern.

5.2 Facility Improvements

5.2.1 Improve Irrigation Efficiency

Reductions in the water volume currently estimated to be utilized could occur by improving the efficiency of agricultural irrigation techniques. Irrigation equipment types range in efficiency, with big gun irrigation being the least efficient (65 percent), sprinkler irrigation being more efficient (75 percent), and drip irrigation being the most efficient (90 percent). As discussed in Section 2.4.1, approximately 82 percent of irrigated acres in the Planning Area are irrigated with big gun systems. Thus, irrigation efficiency in the Planning Area could potentially be improved, where feasible, by converting from big gun to sprinkler or drip irrigation.

Table 5-2 provides a generalized estimate of the improvement to irrigation efficiency, and resulting water savings, that could result from replacement of big gun systems in the

Planning Area with sprinkler or drip irrigation. Several assumptions were made to calculate potential water savings from improved irrigation efficiency. Several crops, including potatoes, corn silage, and pasture, were excluded because they are not suitable for sprinkler or drip irrigation. Turf and apples were also excluded from the table because these crops are already irrigated with sprinkler or drip irrigation. Further assumptions were made regarding the type of equipment appropriate for the replacement of big gun systems, based on crop characteristics and typical irrigation practices.

Table 5-2. Estimate of Water Savings with Improved Irrigation Efficiency in the Planning Area

Crops Suitable for Sprinkler or Drip Irrigation	Estimated 2005 Irrigated Acres	Estimated 2005 Irrigated Acres with Big Gun Systems		Estimated 2005 Irrigation Requirement (afy)	Irrigation Equipment Conversion Type	Estimated Irrigation Requirement with Improved Irrigation Efficiency (afy)	Estimated Reduction in Irrigation Requirement with Improved Irrigation Efficiency	
		Acres	%				afy	%
Raspberries and Blueberries	2,060	577	28%	3,122.80	Big Gun to Drip	2,819.71	303.09	10%
Other	583	126	22%	505.80	Big Gun to Drip	471.03	34.78	7%
Vegetables	573	299	52%	533.03	Big Gun to Sprinkler	493.42	39.61	7%
Cucumbers	294	294	100%	292.12	Big Gun to Sprinkler	253.17	38.95	13%
Vegetable Seed	143	143	100%	142.08	Big Gun to Sprinkler	123.14	18.94	13%
Strawberries	28	28	100%	20.64	Big Gun to Drip	14.91	5.73	28%
Total	3,681	1467	39%	4,616.47	-	4,175.37	441.10	10%

Source: Previous tables

The crops identified as suitable for conversion from big gun systems, including raspberries and blueberries, other crops (see Table 2-6) vegetables, cucumbers, vegetable seed, and strawberries, comprise 3,681 acres, or 24 percent of the estimated 15,684 acres irrigated in the Planning Area in 2005. Of the 3,681 acres of crops suitable for sprinkler or drip irrigation, 1,467 acres, or 39 percent, were irrigated by big gun systems in 2005. Thus, based on current crop patterns, the opportunity exists to improve irrigation efficiency on approximately 1,467 acres, or 9 percent of the 15,684 acres irrigated in the Planning Area in 2005.

Based on the assumptions described above, an estimated water savings of 441 afy could be achieved by replacing big gun systems with sprinkler or drip irrigation (see Table 5-2). This amount represents a 10-percent decrease in the requirement for the crops included in Table 5-2, but is less than 0.02 percent of the estimated total irrigation requirement of 25,383 afy needed in the Planning Area (see Table 2-8). However, when considered in terms of water needs (see Section 2.4.3), the potential savings of 461 afy equates to a 41-percent reduction in the estimated exceedance of water allocated in water rights, pending applications, and water right claims (see Table 2-12).

If funding were available, it is likely that the districts could work with individual landowners to implement this action with little or no assistance from other entities. This action presents a

viable opportunity for the districts to lessen the water deficit described in Section 2.4 and impacts to streamflow described in Section 4.2.

5.2.2 Water Storage

The timing of surface water diversions could be shifted to non-critical streamflow periods by utilizing off-channel or in-channel storage projects. The need for irrigation water generally coincides with the natural low flow periods for watercourses. This means that irrigation water may be removed from a stream when the stream is already at its low-flow stage during the summer months. If irrigation water were removed during periods of greater streamflow and stored for use in the summer months, this could lessen the impact of agricultural diversions during the summer.

Off-channel, aboveground water storage would require construction of reservoirs in locations suitable to replace current surface water diversions. The locations of existing surface water diversions, based on the location information recorded in the WRTS database (see Section 2.4.2), are shown in Exhibit 2-10. The recorded surface water diversions are dispersed throughout the Planning Area; in many cases, it would be difficult to locate a reservoir that could provide water to replace several surface diversions, and construction of a distribution system could be cost-prohibitive. The apparent exceptions are in the northern portion of the Planning Area, where clusters of surface water diversions are apparent near the Samish River and Joe Leary Slough. A feasibility study would be necessary to evaluate the cost-effectiveness of this option.

In-channel storage, through the use of check dams, is an option already utilized by some landowners in the Planning Area for irrigation. As discussed in Section 4.5, the use of check dams has potential impacts on water quality and listed species, including water temperature, dissolved oxygen, turbidity, and nutrient loads. Expanded use of this water storage option would only be feasible if the potential impacts were addressed. WDFW does not typically support creating in-channel storage in fish-bearing watercourses.

5.2.3 Install, Repair, or Upgrade Fish Screens

As discussed in Section 4.7.3, the diversion of surface water using unscreened or improperly screened intake diversions could result in a direct and critical impact to fish populations. If diversion intakes are not properly screened, entrainment and/or impingement of juvenile salmonids could occur and would result in a direct take of those species. A review of water rights identified 53 surface water diversions on 13 fish-bearing watercourses (see Table 4-5). Insufficient data exists to assess the condition of the fish screens on these diversions; an inventory of surface water diversions is also listed as a potential action (see Section 5.5.5). If an inventory were conducted, fish screens that require repair or upgrade would be identified, and new screens would be installed on those surface water intakes that are not screened. If funding were available, these actions could be implemented by individual landowners with assistance from the districts. There are grants available to assist with installing fish screens.

Large volume pumps are used at several tide gate locations as auxiliary facilities to assist in evacuating drainage water from the system that results from storm events, or when the tide level prohibits adequate drainage during a tidal cycle. As noted in Section 4.5.3, the pump stations within the Planning Area are currently not screened. Screening the pump stations that are in fish-bearing waters is required by Washington State law, and the parties to the

Skagit Drainage and Fish Initiative are working together to either screen the pump stations or replace the existing pumps with fish friendly pumps.

5.2.4 Improve or Provide Fish Passage

Fish passage should be provided at all facilities where suitable salmonid habitat occurs upstream of the structure, including tide gates, culverts, pump stations, flood gates, and bridges. This may be accomplished through removal or modification to the in-water structures. In fish-bearing watercourses, drainage could be improved by replacing existing culverts that are constricting the drainage with culverts designed to provide fish passage. An inventory of fish screens and fish passage problems (see Section 5.5.5) is a potential action. To be most beneficial, fish passage must accommodate both upstream and downstream movement and must also address all life stages that may be present. However, modification of any of the existing structures related to the drainage infrastructure will need to be designed in such a way as to minimize interference with the drainage infrastructure. It is likely that the districts would be limited in their ability to provide fish passage at most tide gates. Technical and financial assistance from other entities would be required to implement this action.

5.2.5 Restore Riparian Areas

Restoration of watercourses that are part of the drainage infrastructure should be considered. There are significant potential water quality and habitat benefits from restoring riparian areas along fish-bearing watercourses. Additionally, as facility infrastructure is repaired and replaced, restoration of the adjacent riparian area should be conducted where feasible. Riparian plantings should be designed and installed to allow access for ditch and facility maintenance activities, and to minimize interference with drainage facility function. The adjacent riparian areas should be re-vegetated with native species appropriate to the site. Riparian vegetation improvements would contribute to improved water quality conditions, provide bank stabilization, improve fish habitat conditions, and provide terrestrial wildlife habitat. They could also be designed to discourage reed canary grass, which would reduce the mowing, herbicide, and dredging activities and costs of the districts.

Drainage Maintenance Plans provide for WDFW and the districts to “work collaboratively and cooperatively to identify and implement acceptable Habitat Improvement Projects” (WDFW, 2005a). Projects that are identified and agreed upon by all parties are included in each district’s DMP (where fish bearing watercourses occur within a district’s boundary). New projects will be evaluated and added to the DMPs as necessary during each DMP’s 5-year review cycle.

Regulatory guidelines will also need to be considered. The Corps has guidelines regarding dike maintenance activities that require the removal of large woody stemmed plants, which may limit the ability of the districts to implement this option.

It is likely that the districts would require technical and financial assistance from other entities to implement this action. Assistance on habitat restoration projects is available from the Skagit Conservation District (licensed Professional Engineer on staff), and the Skagit Fisheries Enhancement Group (SFEG), or other organizations.

5.2.6 Minimize Bank Armoring

When opportunities arise and where flood protection and critical bank stabilization are not compromised, the removal or minimization of bank armoring materials should be attempted. Bank armoring reduces the complexity of channel habitat and typically creates restrictions in the channel morphology. Impacts occur both upstream and downstream of the armored site. As facilities are repaired or replaced, less obtrusive techniques, described as bio-engineering, should be employed to minimize impacts from the presence of the infrastructure. Where possible, elimination of bank hardening should be pursued with the following goals: reconnection to the floodplain, restoration of off-channel habitat, reconnection to intertidal processes, and improved in-channel habitat.

The districts may need the assistance of engineers or designers specializing in bio-engineering methods to implement this action. Bank protection through bio-engineering should be specified in any design or construction contracts created for facility repair and replacement, where appropriate.

5.2.7 Reduce Diversions from Small Watercourses

As discussed in Section 4.2.1, the impact of agricultural irrigation surface water diversions on small watercourses in the Planning Area is not fully understood. However, it is likely that reducing the number and/or volume of diversions from these watercourses could have beneficial impacts to water quality, and to habitat in fish-bearing watercourses. The districts could utilize a variety of options described in this section to reduce diversions from small watercourses.

To implement this option, an evaluation of water rights and existing watercourse impacts would be needed. Development of replacement options specific to each water right would need to be identified. Further, cooperation with Ecology and other agencies would be necessary to make changes to the existing water rights. The districts would need technical and other assistance to implement this option.

5.3 Operational Changes

5.3.1 Conversion from Surface to Groundwater

Surface water diversions could be reduced by substituting groundwater sources. Groundwater could also potentially be used as a supplemental source of water. This option would benefit streamflow if no continuity exists between groundwater and surface water, or if there is continuity but with a sufficient time lag so that the effect of groundwater withdrawal does not affect a stream during a critical flow period. The replacement of surface water diversions with groundwater would involve drilling new wells and transferring existing surface water rights to a groundwater source and changing the point of withdrawal (see Section 5.4.1). The use of groundwater as a supplemental source would require a new water right (see Section 5.4.2).

As described in Section 2.4.2, there are 54 surface water diversions under water rights in the Planning Area, for a total instantaneous rate (Qi) of 24 cfs and an annual quantity (Qa) of 3,458 afy (see Table 2-9). The locations of these diversions are shown in Exhibit 2-9. In the southern and western portions of the Planning Area, it is likely that groundwater in some locations may not be usable for irrigation due to saltwater intrusion. However, the potential

does exist for some surface water diversions to be replaced with groundwater, and for groundwater to be utilized as a supplemental source in some areas.

Insufficient data exists at this time to determine the extent of hydraulic connection between the groundwater table and watercourses in the Planning Area. As discussed in Section 1.2.2, Skagit County, Ecology, and the USGS are in the process of planning a study of groundwater flow in the Skagit Basin and groundwater-surface water interactions in lower basin tributaries. This study would provide some of the information necessary to evaluate the technical feasibility of this action.

The implementation of this action could be simplified with the creation of a Water Conservancy Board in the Skagit Basin (see Section 6.2.1) and a district Board of Joint Control (see Section 6.2.1).

5.3.2 Imported Water

Surface water diversions could be reduced by importing water from a source independent of the Planning Area. The most probable source of imported water in the Planning Area is Public Utility District #1 of Skagit County (PUD), although the PUD obtains its water from lower Skagit Basin tributaries that contribute to flows in the Planning Area. As discussed in Section 2.2.2, some landowners in the Planning Area utilize the PUD as a supplemental source of water for irrigation.

The cost for implementation of this action would depend on the extent to which PUD water is to be utilized. The availability of PUD water is currently limited to the existing PUD service area. The cost of expanding the PUD service area would have to be considered in a detailed feasibility study of this option. The cost of the water itself is also a factor. It is unlikely that the districts could independently generate the funding necessary to implement this option.

The implementation of this option could be assisted through the creation of an Irrigation Division within the PUD. This option is discussed in detail in Section 6.2.2.

5.3.3 Reclaimed Water

Surface water diversions could be reduced by substituting reclaimed water. Irrigating with reclaimed water is most feasible for crops not used for human consumption. Since most of the irrigated crops in the Planning Area are grown for human consumption, reclaimed water irrigation may not be a viable alternative.

The most likely source of reclaimed water would be from the City of Mount Vernon or Anacortes wastewater treatment plants. Costs for plant upgrades to bring water up to reclaimed water standards would have to be considered, as well as the distribution system to convey the reclaimed water to farmlands. Using reclaimed water on fields closest to the treatment plant would minimize the distribution cost.

Another potential source of reclaimed water is the water used for washing flower bulbs. This water is currently routed through the drainage ditch system, and at times reclaimed for irrigation. The extent of this water use and the feasibility of expanding this use are unknown.

5.3.4 Irrigation Scheduling

The timing of surface water diversions could be shifted by irrigation scheduling to reduce impacts to streamflow. An irrigation scheduling system would spread the withdrawals out over a longer time period than what would normally occur otherwise. For example, if most farmers irrigate on a certain day of the week, a schedule might direct some landowners to irrigate on a particular day and others to irrigate on a different day. While irrigation scheduling would not affect the overall volume of water used, it could have a beneficial impact to amount of water withdrawn at any given time. This relatively inexpensive action could be utilized to minimize agricultural impacts on specific watercourses where streamflow is of particular concern, such as the Samish River. However, this strategy may not be feasible with certain crops or on certain soils.

5.3.5 Agricultural BMPs

The agricultural community can further help protect water quality by continuing to implement BMPs relevant to water quality. As discussed in Section 2.2, a variety of BMPs and other voluntary conservation activities are used in the Planning Area; many of these BMPs are implemented on an individual landowner basis. Those landowners that are already participating should continue to enact the BMPs; landowners that are not fully participating could be encouraged to work with the Skagit Conservation District to implement BMPs where feasible. The districts would continue to implement existing BMPs associated with the Drainage Maintenance Agreements (see Section 2.2.3) and could work with the Conservation District to raise awareness and participation among landowners within the Planning Area.

Where livestock access to watercourses or the riparian area occurs, fencing of the watercourse and riparian corridor should be implemented, and off-channel watering created. Restoration of impacted riparian areas should also be undertaken. The plan should also consider impacts within the adjacent floodplain areas by incorporating pasture management, including rotational grazing to allow plant re-growth, and controlled grazing times to retain sufficient vegetation to protect stream banks, dissipate stream energy, and trap sediments during high flow periods.

The districts do not have the authority to require individual landowners to participate in BMPs or conservation activities, so the ability of the districts to fully implement this action would be limited to education and outreach activities.

5.3.6 Improve Riparian Buffer Quality

Water quality within the Planning Area can be improved by improving buffer riparian quality with vegetation and, where feasible, through the use of cover crops or filter strips. Minimizing animal use and farm access points will further improve the effectiveness of riparian buffers. Development of additional sedimentation basins at key locations to contain excessive sediment from fields may be utilized to reduce transport to watercourses. Hedgerow and shrub-type riparian plantings can be used where feasible to provide shade for adjacent watercourses. Riparian buffers that allow woody stem vegetation sufficient to shade the watercourse can also preclude mowing.

Implementation of the use of cover crops, filter strips, and improved field tillage practices could be completed by individual farmers, and encouraged through the districts by providing guidance and education. Limiting animal access to riparian areas could be assisted by

fencing programs supported by the County and/or by individual landowners. Minimizing the number of farm access points within the buffer would be a landowner decision and action. The development of sedimentation basins would likely require the assistance of engineers to ensure that sufficient detention is created to allow sediment deposition. Landowners could implement the application of vegetation filter strips. Organizations such as the Skagit Conservation District or Washington Department of Agriculture could assist each landowner with development of appropriate BMPs.

5.3.7 Reduce Pesticide Use

Pesticide use could be improved and potentially reduced by utilizing information presented in the Pest Management Strategic Plans developed by Washington State University for specific crop types to improve current applications (see http://wsprs.wsu.edu/CropProfiles.html). Biological and/or cultural control methods could be considered.

Another option to consider is the conversion to organic farming practices. Organic farming is a fast-growing segment of agriculture in Washington State. This growth is driven by consumer demand, environmental and regulatory pressures, and numerous successes in enhancing the natural processes to control pests, improve soil, and increase product quality (see http://csanr.wsu.edu/Organic/index.htm).

The districts do not have the authority to require individual landowners to participate in actions to reduce use of agricultural pesticides. The ability of the districts to fully implement this action would be limited to education and outreach activities.

5.3.8 Improve Intertidal Habitat

Targeted intertidal and estuarine habitat improvements could be realized through facility modifications or operational changes to drainage control facilities and use of water to provide flushing flows or a more natural hydrologic pattern. Removal of infrastructure and restoration of the intertidal interface should be attempted where drainage system function can be maintained and willing landowners are present. These actions will likely require assistance and funding support for the districts and landowners. Participation by local, state, and federal agencies and by the Tribes would be essential for any drainage infrastructure change and/or restoration project. The agricultural community, through its organizations and the drainage and irrigation districts, should continue to participate and partner with agencies, Tribes, and organizations to identify and implement agriculture-endorsed habitat restoration projects. The opportunity to integrate these projects while preserving the farmland base, maintaining drainage infrastructure function, and implementing the Drainage and Fish Initiative through the DMAs and DMPs is the principle objective of this process. The agricultural community should continue to work jointly with others to secure funding, pursue design work and permit acquisition, and oversee construction of these projects.

Several reports and studies have outlined a targeted project approach to the recovery and restoration of estuarine habitat in the Skagit Basin. The Skagit Chinook Recovery Plan (SRSC and WDFW, 2005) identifies several projects using a long-term approach to restoration of 2,500 to 3,000 acres of estuary habitat needed to achieve target objectives for Chinook rearing areas in the Skagit Basin. The House Bill 1418 Report (Smith and Manary, 2005), the Skagit Tribal and Agricultural Accord, and the Greater Skagit Delta Initiative have proposed priority projects and coordinated approaches to habitat recovery and restoration.

5.4 Policy Changes

5.4.1 Changes to Existing Water Rights

Implementing a new approach to water management in the Skagit Basin provides an opportunity to reconcile the status of existing water rights, and simultaneously creates a venue to address the protection and preservation of instream flows. The Trust Water Right program administered by Ecology could be used to secure existing water rights in watercourses with critical instream flows, as alternative water sources are developed through changes to existing water rights, new permits, or efficiency projects.

The water rights identified in Section 2.4.2 were issued for specified instantaneous rate and annual quantity, and a specific point of diversion or withdrawal, place and purpose of use, and number of irrigated acres. Changes to these water rights will allow for greater flexibility in meeting the irrigation needs and preserving instream flows in the Planning Area. There are a variety of reasons for making changes to these water rights, including:

- Crops are typically rotated between fields on an annual basis.
- In some cases, multiple crops are grown on the same field during a single irrigation season.
- Some water rights are very old and changes in water demands and irrigated crop types have occurred over the years.
- Some water rights are not being utilized to the full extent of the authorized water use.
- Some irrigated lands are not identified as a place of use on existing water rights.
- Some lands are proposed for irrigation and are the subject of pending applications for new water rights.
- There is a limited amount of water available for appropriation for new water rights, and adopted instream flows in some areas may limit water availability for water rights.

Changes to any restrictions on a water right require review and approval by Ecology. This process could potentially be enhanced through the formation of a Water Conservancy Board in the Skagit Basin (see Section 6.2.1).

5.4.2 New Water Rights

As discussed in Section 2.4.2, 44 pending water right applications for irrigation were identified in the Planning Area, for a total estimated quantity of 51 cfs (6,518 afy) and 4,345 irrigated acres (see Table 2-10). If a portion of these pending applications were approved, the new water rights would significantly reduce the amount of water needed to make up the difference between water needs and water allocated in water rights (see Table 2-12). In addition to pending applications, the districts may choose to apply for a new water right to be used anywhere in the district. This process could be facilitated by a district Board of Joint Control (see Section 6.2.1).

The establishment of a reservation of water for irrigation as part of the Skagit River instream flow rule amendment (see Section 1.2.2) could provide for approval of some of the pending

water right applications in the Planning Area. The proposed reservation amount of 3,564 acre-feet would not be subject to interruption based on instream flow requirements.

It is possible that non-interruptible groundwater sources could be utilized for new water rights if the groundwater withdrawal does not impair a surface water body subject to instream flow requirements. As discussed in Section 1.2.2, a study of groundwater flow in the Skagit Delta is planned.

Interruptible surface or groundwater rights could also be a viable option for Skagit Basin irrigators. These rights would be junior to other existing water rights, new water rights from the agricultural irrigation water reservation for WRIAs 3 and 4, and instream flow requirements in the Skagit River (see Section 1.2.2). This means that water allocated under these rights could not be used at times when the streamflow falls below the required instream flow rate. Interruptible water rights could be utilized for early season crops, which would need irrigation only during the portion of the growing season during which stream flows typically exceed instream flow requirements, or for crops that do not require irrigation continuously throughout the growing season, but produce a better yield with some irrigation. Implementation of this option would require irrigators to submit water right applications to be reviewed and approved by Ecology.

5.4.3 District Capital Improvement Plan (CIP)

It is recommended that the districts develop a Capital Improvement Plan (CIP) for the purpose of planning for the repair, replacement, and improvement of district infrastructure. The CIP should include: an assessment of the existing condition of the district's infrastructure; a prioritized list of improvement projects; cost estimates for proposed improvements; and a schedule for completion of improvements. Each district could create its own CIP, or a comprehensive CIP could be created to include the districts participating in the Board of Joint Control (see Section 6.2.1). It is likely that the districts would be able to implement this action without significant assistance from other parties. Integration of the CIP with the ongoing efforts of the Drainage Maintenance Agreements (see Section 2.2.3) would assist the districts in planning and achieving needed repairs along with water quality and habitat improvements.

Once a CIP is created, the implementation of actions related to infrastructure may be incorporated; for example, an action such as fish passage improvement could be scheduled to coincide with replacement of a culvert. This process would benefit the districts' planning and budgeting activities, and would provide agencies and other stakeholders with an understanding of the districts' priorities and plans for implementation of some CIDMP actions.

5.4.4 Public Education and Outreach Program

The districts, led by WWAA, could develop and implement a public education and outreach program to provide information about ongoing efforts to minimize impacts to water quality and habitat, and inform others about the agricultural community's role in this process. As discussed in Sections 2, 3, and 4 of this CIDMP document, the districts have limited control over the actions of others and their impacts. Through this program, the agricultural community could improve the public's understanding of the Skagit Basin's natural resources and hopefully change behaviors that impact these resources.

There are several organizations and initiatives that are developing and pursuing the implementation of salmon habitat restoration in the Skagit Basin. Most of these proposed restoration projects would affect the agricultural land base, and many specific restoration projects would directly impact individual landowners in the Planning Area. WWAA and the districts could provide broad-based and collaborative agricultural participation in the many forums that are addressing salmon habitat restoration activities. The agricultural community could engage in the holistic discussion, decision-making, and endorsement of restoration project activities that work for both salmon and farming in the Skagit Basin.

In addition to general public awareness and collaboration, the districts could also work to educate the agricultural community about their potential impacts, and ways they can minimize those impacts. This is one of few options that the districts can implement on their own; however, the impact of such a campaign could be much greater with additional outside funding.

5.5 Information Collection and Monitoring Programs

5.5.1 Irrigation Flow Monitoring

The installation of flow meters at points of withdrawal and diversion would provide detailed, specific data on the amount of water being used for irrigation in the Planning Area. This information would provide a more accurate assessment of the districts' water needs than was possible by applying the crop water demand estimates used in this CIDMP (see Section 2.4.1). The districts could implement this action if funding was available and landowners were willing to participate. The Washington State Legislature has appropriated monies to Ecology for cost-sharing the purchase and installation of measuring devices. Ecology has entered into agreements with Conservation Districts to accept applications and distribute the money through cost-share contracts. The Skagit Conservation District is currently working on a Memorandum of Understanding with the Whatcom Conservation District that addresses this issue.

5.5.2 Groundwater-Surface Water Connectivity Study

As discussed in Section 5.3.1, Skagit County, Ecology, and the USGS are in the process of planning a study of groundwater flow in the Skagit Basin and groundwater-surface water interactions in lower basin tributaries. The purpose of this study is to provide water resource managers with a thorough technical basis for assessing the effects of current and future groundwater withdrawals on streamflows in various watercourses in the Skagit Basin. The study is scheduled to include 3 years of data collection that will result in groundwater modeling and mapping. WWAA is cooperating with the study and will monitor its progress.

5.5.3 Samish Watershed Fecal Coliform TMDL

The agricultural community can help protect water quality by participating in and supporting agriculture-related data collection elements of the Samish Watershed Fecal Coliform TMDL study. As discussed in Section 3.1.4, the Samish TMDL study will identify and evaluate a variety of potential sources of fecal coliform bacteria, including agricultural, domestic and municipal, natural background, and other sources. By cooperating with Ecology, the districts will have an ongoing role in and understanding of the TMDL process, and will gain valuable

water quality and quantity data that will better inform the CIDMP process and provide a stronger basis for Ecology to provide assurances under the CWA.

5.5.4 Water Quality Monitoring

There is insufficient water quality data available with which to fully characterize water quality conditions within the Planning Area. More information is needed to properly assess potential water quality impacts to receiving waters, particularly with regard to the drainage ditches and associated discharge points. It is recommended that the districts participate in ongoing water quality monitoring activities (see Section 3.1.3), and cooperate in the Samish Watershed fecal coliform TMDL monitoring program (see Section 3.1.4) and the WSDA pesticide study (see Section 3.1.5). These water quality monitoring programs will result in improved knowledge and understanding of water quality conditions in the Skagit Basin and potential impacts of agricultural activities and infrastructure.

5.5.5 Drainage Flow Monitoring

Insufficient data exists to accurately describe the extent of the area outside the Planning Area that could be impacted by district activities or infrastructure. If the flow from the drainage network were measured, a model could be constructed to characterize the extent of this potential impact. This action could be implemented by installing flow meters in the drainage network to collect data. It is likely that the districts would require technical and financial assistance to utilize these data in a model or other analysis.

5.5.6 Fish Screen and Fish Passage Inventory

An inventory of all agricultural irrigation surface water diversion intakes from watercourses with salmonid fish presence or the potential for utilization should be completed, including an inventory of fish passage problems. The inventory should determine if intakes comply with NOAA Fisheries and WDFW fish screening criteria. If the intake or the associated infrastructure spans the watercourse, it should also be determined whether fish passage is impaired. Intake facility inspection should be completed by an engineer experienced in fish screen design and knowledgeable about the required criteria. Funding and technical assistance for the districts would be required.