

APPENDIX F
**Lake Survey
Results**

APPENDIX F

Lake Survey Results

OBJECTIVE

The Nisqually Basin within Pierce County encompasses more than 15 lakes. The Nisqually Basin Characterization Report noted that much of the development within the basin planning area is concentrated around the lakes. Based on the available information, the report identified water quality and flooding problems at several lakes. However, the report noted that little information was available for many of the lakes.

To help address this data gap, Phase II of the Nisqually Basin planning project included a public survey that focused on lake shore property owners. Brown and Caldwell (BC) and Surface Water Management developed a questionnaire and sent it to nearly 800 lakeshore property owners. This memorandum describes how the survey was conducted and summarizes the key findings.

SURVEY AREA

BC queried the Pierce County tax parcel database to identify all owners of property near the lakes shown in Figure F-1 and listed below.

Alder Lake	Ohop Lake
Clear Lake	Rapjohn Lake
Cranberry	Silver Lake
Harts Lake	Tanwax Lake
Kreger Lake	Trout Lake
Lake Serene	Tule Lake
Lake Twenty-Seven	Twin Lakes
Mud Lake	Whitman Lake

The database query identified owners of property within 200 feet of each lake. The query also included properties within 200 feet of designated floodplain areas around the lakes. Parcels were included even if only a small portion of the parcel was within the 200-foot buffer around the lake or its floodplain. Parcels owned by the County or public utilities were removed, resulting in a mailing list with 782 addresses.

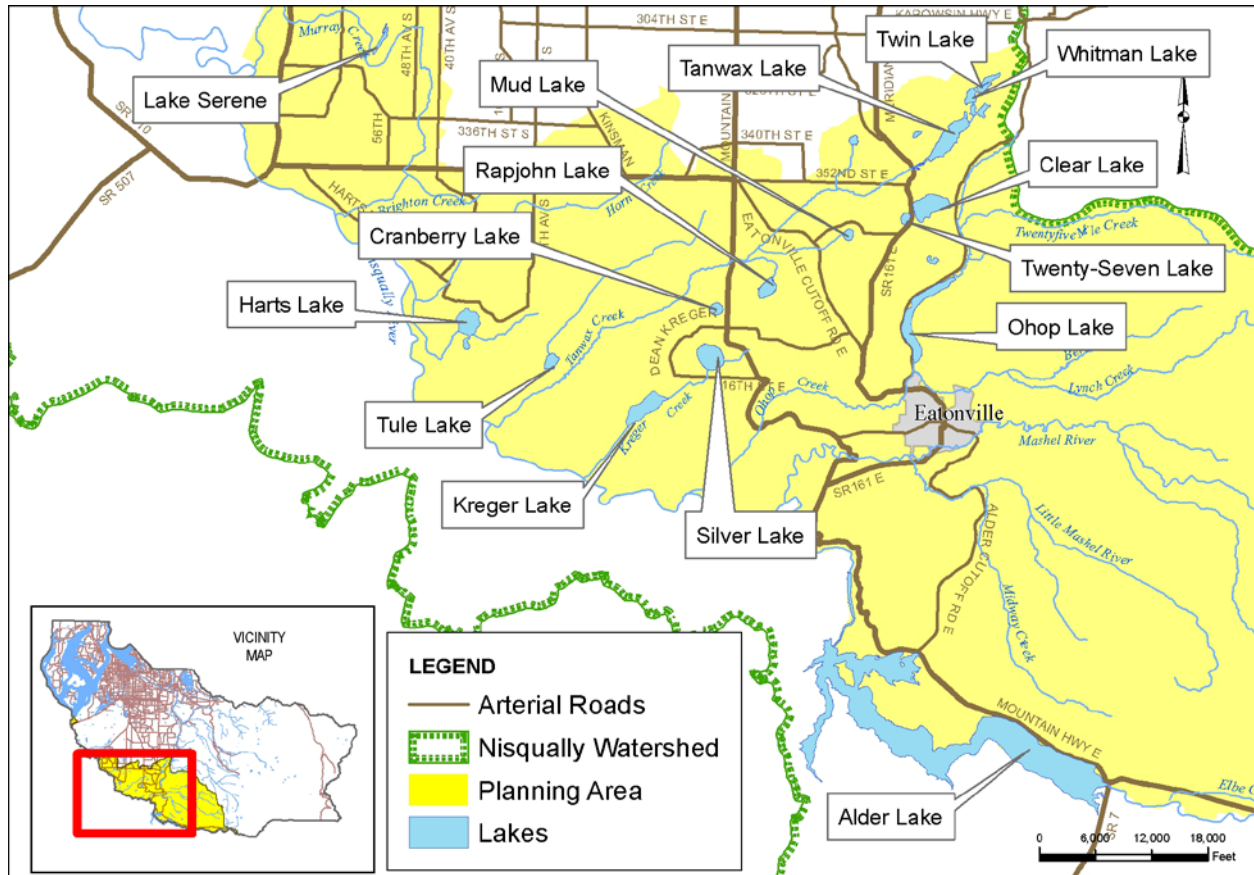


Figure F-1. Lakes Included in Nisqually Basin Plan Survey

QUESTIONNAIRE DEVELOPMENT, DISTRIBUTION, AND RESPONSE

BC and Surface Water Management developed a questionnaire that asked for input on the following issues:

- Lake access and use
- Lake water level control
- Flooding
- Fish populations
- Algae blooms
- Aquatic weeds
- Water quality

- Fertilizer and lake habitat
- Septic systems
- Lake management groups
- Willingness to pay for lake management actions
- Other problems and issues

Attachment 1 to this TIM contains a copy of the questionnaire.

The questionnaire was mailed to the 782 property owners identified through the GIS query described above. As of 8/13/07, the County had received 103 responses. Table F-1 shows number of responses for each lake.

Lake	Responses
Alder Lake	7
Clear Lake	15
Cranberry	0
Harts Lake	6
Kreger Lake	0
Lake Serene	3
Lake Twenty-Seven	2
Mud Lake	0
Ohop Lake	27
Rapjohn Lake	1
Silver Lake	5
Tanwax Lake	13
Trout Lake	0
Tule Lake	0
Twin Lakes	6
Whitman Lake	8
Lake Not Identified	10
Total Responses	103
Total Sent out	782
Percent	13.2

As shown in Table F-1, approximately 13 percent of the questionnaires were filled out and sent back to Surface Water Management. No responses were received from residents near Cranberry Lake, Kreger Lake, Mud Lake, Trout Lake, and Tule Lake. Ten of the responses did not identify

a specific lake or provide contact information, so the information contained in these responses could not be assigned to a specific lake.

OVERVIEW OF QUESTIONNAIRE RESULTS

Public Access and Use

All of the lakes for which responses were received have public access except for Lake Serene, Lake Twenty-Seven and Twin Lakes (Table F-2). All lakes are used for boating, swimming and fishing. In addition, Clear Lake, Harts Lake, and Silver Lake are used for irrigation. Harts Lake is used for irrigation of Wilcox Farms dairy. No commercial ventures were identified on any lake.

Table F-2. Questionnaire Results Summary - Public Access and Use

Lake	Public Access					Uses					
	Boat Ramp	Public Dock	Park	Beach	None	Boating/ Waterskiing	Commercial Ventures	Swimming	Fishing	Irrigation	Other
Alder Lake	X	X	X	X		X		X	X		
Clear Lake	X	X				X		X	X	X	
Harts Lake	X		X	X		X		X	X	X	
Lake Serene					X			X	X		
Lake Twenty-Seven					X			X	X		
Ohop Lake	X					X		X	X		
Rapjohn Lake	X										
Silver Lake	X					X		X	X	X	
Tanwax Lake	X	X	X	X		X		X	X		
Twin Lakes					X	X		X	X		
Whitman Lake	X					X		X	X		

* No responses were received for Cranberry Lake, Kreger Lake, Mud Lake, Trout Lake, and Tule Lake

Problems Identified by Survey

Respondents were asked to describe problems concerning flooding, fish populations, algae blooms, aquatic weeds, and water quality. Problems identified by survey respondents are listed in Table F-3.

Table F-3. Questionnaire Results Summary - Problems

Lake	Problems				
	Flooding	Fish Kills	Algae Blooms	Aquatic Weeds	Water Quality
Alder Lake	X	X	X	X	
Clear Lake	X	X	X	X	X
Harts Lake	X	X	X	X	X
Lake Serene	X	X	X	X	X
Lake Twenty-Seven					
Ohop Lake	X	X	X	X	X
Rapjohn Lake					
Silver Lake	X	X	X		X
Tanwax Lake	X	X	X	X	X
Twin Lakes	X		X	X	X
Whitman Lake	X	X	X	X	X

* No responses were received for Cranberry Lake, Kreger Lake, Mud Lake, Trout Lake, and Tule Lake

The Lake Summary Results section below contains more detailed discussions of the information received for each lake.

Lake Management Community Groups

Of the 103 survey respondents, 45 percent indicated that they contribute to a lake management community group and 23 percent indicated that they would be interested in becoming involved in a new community group that address issues in the lake. Figure F-2 summarizes the responses regarding willingness to pay for new lake management activities.

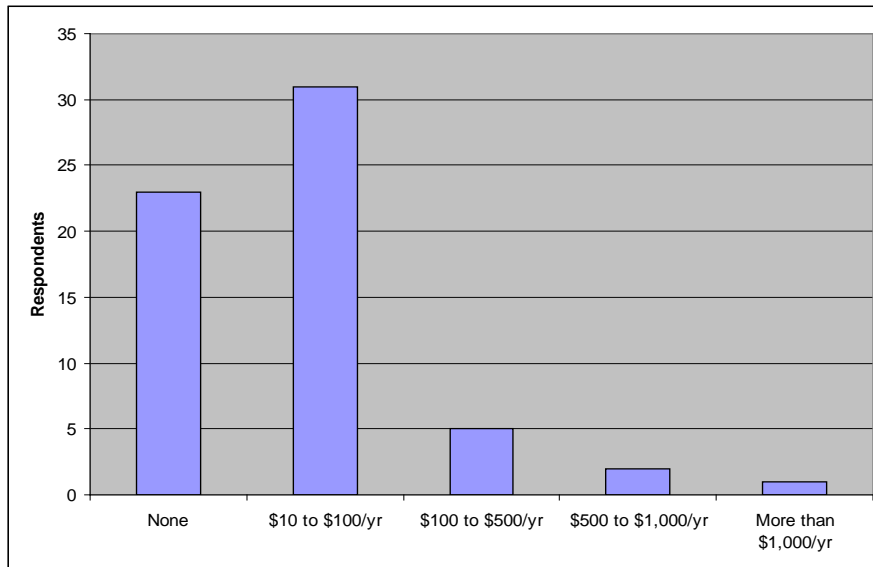


Figure F-2. Amount respondents would be willing to pay for new lake management measures.

LAKE SUMMARY RESULTS

This section describes each lake and provides a discussion of questionnaire results for each lake. No responses were received for Cranberry Lake, Kreger Lake, Mud Lake, Trout Lake and Tule Lake. Also, ten responses did not provide identification as to which lake they are associated with, and results were unable to be used. Problems identified are based only on questionnaire results.

Alder Lake

The GIS query identified 61 parcels within the 200-foot buffer of Alder Lake. Questionnaires were sent to the owners of these parcels. Seven responses were received, for a response rate of approximately 11 percent.

Public Access and Uses

Alder Lake is accessible to the public from a boat ramp, public dock, park, and beach. The lake is used for boating/waterskiing, swimming, and fishing.

Reported Problems

The following problems were identified by the seven survey respondents: for Alder Lake.

- **Flooding** - One respondent reported flooding several times per year, following multiple consecutive storms in the fall and winter. Flooding was rated as somewhat important or least important by five of the seven responses. The lake water level is controlled by a

dam owned and operated by Tacoma Power. Lake water level fluctuates about 10-30 feet per year.

- Fish Kills - One respondent observed occasional dead fish. Fish health was rated as very important by six of the seven respondents.
- Algae Blooms - One respondent reported areas of cloudy blue-green water in warm summer months, and 4 respondents reported no algae blooms; clear water. None were aware of notifications of toxic algae blooms for this lake. Importance rankings vary.
- Aquatic Weeds - One respondent reported dense water weeds that interfere with use of the lake increasing over the past 15 years. Most reported low water weeds that did not interfere with use of the lake, and that weed growth has stayed the same over the past 15 years. Importance rankings vary.
- Other Comments: Two respondents were concerned that the lake has not been kept at full level as required by the permit in the summer months, and feel that City of Tacoma water level management does not support boating recreation during spring and summer, as the lake level is too low.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: One respondent applies chemical fertilizer once a year in the late spring; the other six do not use fertilizer. All responses indicated shoreline is natural vegetation. Three of seven respondents would consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Five of the seven responses indicated a septic system on the property. Four have septic systems pumped every 3-5 years, 1 is pumped every 6-10 years. Septic systems range from 10 to 20+ years old, and are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: One of the seven respondents is involved in a community lake management group (contact info was not provided).
 - *Interest in becoming involved in a group*: One respondent is interested in becoming involved in a community lake management group.
 - *Amount willing to contribute*: Two of the seven respondents are willing to pay \$10 to \$100 per year for new lake management measures.

Clear Lake

The GIS query identified 111 parcels within the 200-foot buffer around Clear Lake. Questionnaires were sent to the owners of these parcels. Fifteen responses were received, for a response rate of approximately 14 percent.

Public Access and Uses

Clear Lake is accessible to the public from a boat ramp and public dock. The lake is used for boating/waterskiing, swimming, fishing, and irrigation.

Reported Problems

The following problems were identified by the fifteen survey respondents for Clear Lake:

- Flooding - Flooding was observed by six of fifteen respondents, who reported flooding of landscaped areas, docks and boatsheds, once a year in the fall and winter. Twelve of the fifteen respondents ranked flooding as somewhat important or least important. The lake water level is controlled by an outlet structure operated/maintained by the Clear Lake Community Club. Lake water level fluctuates up to 6 feet per year.
- Fish Kills – Of the fifteen respondents, two respondents observed occasional fish kills, and three respondents observed massive fish kills. Importance rankings vary.
- Algae Blooms – All respondents reported at least one of the following conditions: Lake looks green, areas of cloudy blue-green water, or surface scum. These conditions were reported in cool winter months, after wet/rainy periods. Fourteen respondents were aware of notifications of toxic algae blooms posted by the Health Department for this lake. All respondents ranked algae blooms as a very important or important issue.
- Aquatic Weeds - Five of the fifteen respondents reported dense water weeds that interfere with use of the lake. Most reported low water weeds that did not interfere with use of the lake. Observations of weed growth increases/decrease vary. Importance rankings vary.
- Water Quality - Eight of the fifteen respondents reported water quality issues: Cloudy water, manure/animal waste, or pets sick after drinking. Water quality was ranked very important by fourteen of the fifteen respondents.
- Other Comments: One survey respondent was concerned that recreational boats are discharging oil and gas in the lake. Two survey respondents were concerned about flooding from ditches next to the road.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Eleven respondents do not use fertilizer, two use organic fertilizer, and two use both organic and chemical fertilizer. Those who use fertilizer apply it once or twice a year in the spring or fall. Shoreline vegetation varies. Seven of fifteen respondents might consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Fourteen of the 15 respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: All of the respondents are involved in a community lake management group, the Clear Lake Community Club.

Contact info: Don Guthrie, President - 360-832-3175

- *Interest in becoming involved in a group*: Three respondents are interested in becoming involved in a new community lake management group.
- *Amount willing to contribute*: One respondent is willing to pay \$100 to \$500 per year, and five respondents are willing to pay \$10 to \$100 per year for new lake management measures.

Harts Lake

The GIS query identified 38 parcels within the 200-foot buffer of Harts Lake. Questionnaires were sent to the owners of these parcels. Six responses were received, for a response rate of approximately 16 percent.

Public Access and Uses

Harts Lake is accessible to the public from a boat ramp, park and beach and public dock. The lake is used for boating/waterskiing, swimming, fishing, and irrigation. Harts Lake is used for irrigation by Wilcox Farms dairy.

Reported Problems

The following problems were identified by the six survey respondents:

- Flooding - Flooding was observed by two of six respondents, who reported flooding of residential structures, landscaped areas, docks and boatsheds, once a year, in the spring and winter. Importance rankings vary. The lake water level is controlled by an outlet, operated/maintained by Wilcox Farms. Lake water level fluctuates about 2-6 feet per year.
- Fish Kills – Three of the six respondents observed occasional fish kills. Importance rankings vary.
- Algae Blooms – Three of the six respondents observed signs of algae blooms. Conditions were reported in warm summer months, after sunny/dry periods. Two respondents were aware of notifications of toxic algae blooms posted by the Heath Department for this lake. Importance rankings vary.
- Aquatic Weeds – Three of the six respondents reported moderate to dense water weeds that interfere with use of the lake. Observations of weed growth increases/decrease vary. Importance rankings vary.
- Water Quality - Two of the six respondents reported cloudy water and manure/animal waste. Importance rankings vary.
- Other Comments: Other concerns include trash in the lake from hunters/fisherman, and cattle grazing near the lake.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Two respondents do not use fertilizer, one uses organic fertilizer, and one uses chemical fertilizer. Those who use fertilizer apply it once a year in the late spring. Four respondents have natural vegetation on the shoreline, and two have bulkheads. Three of six respondents might consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Four of the six respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: One of the respondents is involved in a community lake management group, the Hartwood Community Association (contact information was not provided).

- *Interest in becoming involved in a group:* Four respondents are interested in becoming involved in a new community lake management group.
- *Amount willing to contribute:* One respondent is willing to pay \$500 to \$1000 per year, one is willing to pay \$100 to \$500 per year, and one is willing to pay \$10 to \$100 per year for new lake management measures.

Lake Serene

The GIS query identified 48 parcels within the 200-foot buffer of Lake Serene. Questionnaires were sent to the owners of these parcels. Three responses were received, for a response rate of approximately 6 percent.

Public Access and Uses

Lake Serene is not accessible to the public. The lake is used for swimming and fishing.

Reported Problems

The following problems were identified by the three survey respondents:

- Flooding - Flooding was observed by one of the three respondents, who reported flooding of landscaped areas, less than once every three years, in the winter. Flooding was rated not important by all respondents. The lake water level is controlled by an outlet, and it respondents did not know who operated/maintained the outlet. Lake water level fluctuates about 0-6 feet per year.
- Fish Kills – Two of the three respondents observed occasional fish kills. Fish health was rated as very important by all three respondents.
- Algae Blooms – All three respondents reported signs of algae blooms. Conditions were reported in warm summer months. None of the respondents were aware of notifications of toxic algae blooms posted for this lake. All three respondents ranked algae blooms as very important.
- Aquatic Weeds – All three respondents reported moderate to dense water weeds that interfere with use of the lake, and that weed growth has increased over the past fifteen years. One respondent elaborated to say that even though someone is contracted to spray weeds 2-3 times a year, weeds are thicker and start growth earlier year after year. All three respondents ranked aquatic weeds as very important.
- Water Quality - All three respondents reported cloudy water every year. All three respondents ranked water quality as very important.

- Other Comments: One respondent was concerned about a heavy migratory bird population, and about leaning or dead trees along the shoreline that might be dangerous. Another respondent indicated that the County has lowered the lake to the level it was in 1970 and that this has caused lake water quality to decline.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: One respondent does not use fertilizer, one uses organic fertilizer, and one uses chemical fertilizer. The organic fertilizer is applied once a year in the early spring, and the chemical fertilizer is applied four times a year, throughout the year. Those who use fertilizer apply it once a year in the late spring. All respondents indicated shoreline is natural vegetation. Two of three respondents might consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: All three respondents indicated a septic system on their property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: All three of the respondents are involved in the Lake Serene Homeowners Association, PO Box 698, Roy, WA.
 - *Amount willing to contribute*: One respondent is willing to pay \$500 to \$1000 per year, and two are \$10 to \$100 per year for new lake management measures.

Lake Twenty-Seven

The GIS query identified eleven parcels within the 200-foot buffer of Lake Twenty-Seven. Questionnaires were sent to the owners of these parcels. Two responses were received, for a response rate of approximately 18 percent.

Public Access and Uses

Lake Twenty-Seven is not accessible to the public. The lake is used for swimming and fishing.

Reported Problems

No problems were reported by the two respondents.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Both respondents use organic fertilizer, applying it once a year in the early spring. Both respondents indicated shoreline is natural vegetation. One of the two respondents would consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Both respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary, but both are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: One respondent is involved in a lake management community group (no contact info provided).
 - *Interest in becoming involved in a group*: Neither respondent is interested in becoming involved in a new community lake management group.
 - *Amount willing to contribute*: Neither respondent is willing to pay for new lake management measures.

Ohop Lake

The GIS query identified 199 parcels within the 200-foot buffer of Ohop Lake. Questionnaires were sent to the owners of these parcels. Twenty-seven responses were received, for a response rate of approximately 14 percent.

Public Access and Uses

Ohop Lake is accessible to the public from a boat ramp. The lake is used for boating/waterskiing, swimming, and fishing.

Reported Problems

The following problems were identified by the 27 survey respondents:

- Flooding - Flooding was observed by 22 of the 27 respondents, who reported flooding of residential structures, landscaped areas, docks and boatsheds, several times per year, all year round. Importance rankings vary. The lake water level is controlled by a weir operated/maintained by the Ohop Lake Improvement Club. Lake water level fluctuates about 0-6 feet per year.
- Fish Kills – Nine of the 27 respondents observed occasional fish kills. Importance rankings vary.

- Algae Blooms – Twenty-four of the 27 respondents observed signs of algae blooms. Conditions were reported in warm summer months, after sunny/dry periods. Three respondents were aware of notifications of toxic algae blooms posted by the Heath Department for this lake. Importance rankings vary.
- Aquatic Weeds – Twenty-four of the 27 respondents reported low to moderate water weeds that do not interfere with use of the lake. One reported dense water weeds. Three reported interference with lake use. Observations of weed growth increases/decrease vary. Importance rankings vary.
- Water Quality - Eleven of the 27 respondents reported cloudy water, two reported septic failure/seepage, and one reported manure/animal waste. Importance rankings vary.
- Other Comments: Other concerns include sediment buildup, increasing bird population (especially cormorants), illegal sewage disposal systems, logging above the lake, lake silting in, lake fireworks, building up shorelines, and increase in recreational boating.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Twenty-three of the 27 respondents do not use fertilizer, two use organic fertilizer, and one uses chemical fertilizer. Those who use fertilizer have various application frequencies. Fourteen respondents have natural vegetation on the shoreline, and four have landscaped shorelines, eight have beach shoreline, and six have bulkheads. Seven respondents might consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Fifteen of the 27 respondents indicated a septic system on the property. Eleven of the 27 respondents indicated there is not a septic system on the property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups:* Twenty-one of the twenty-seven respondents are involved in a community lake management group, the Ohop Lake Improvement Club, PO Box 566, Eatonville, WA.
 - *Interest in becoming involved in a group:* Four respondents are interested in becoming involved in a new community lake management group.
 - *Amount willing to contribute:* One respondent is willing to pay more than \$1000 per year, one is willing to pay \$100 to \$500 per year, and seven are willing to pay \$10 to \$100 per year for new lake management measures. Nine are willing to pay none.

Rapjohn Lake

The GIS query identified 14 parcels within the 200-foot buffer of Rapjohn Lake. Questionnaires were sent to the owners of these parcels. One response was received, for a response rate of approximately 7 percent.

Public Access and Uses

Rapjohn Lake is accessible to the public from a boat ramp. The one respondent indicated that the lake provides aesthetic benefits.

Reported Problems

No problems were reported by the one respondent.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: The one respondent does not use fertilizer, and shoreline is natural vegetation. Planting native vegetation along the lakefront to protect and improve water quality might be considered.
- Septic Systems: The one respondent has a septic system that is 1-10 years old and is pumped every 1-3 years. The respondent reported it to be in good condition.
- Lake Management Community Groups:
 - *Existing Groups/Interest in becoming involved*: The one respondent was not involved in a lake management community group, and was not interested in becoming involved in one.

Silver Lake

The GIS query identified 52 parcels within the 200-foot buffer of Silver Lake. Questionnaires were sent to the owners of these parcels. Five responses were received, for a response rate of approximately 10 percent.

Public Access and Uses

Silver Lake is accessible to the public from a boat ramp. The lake is used for boating/waterskiing, swimming, fishing and irrigation.

Reported Problems

The following problems were identified by the five survey respondents:

- Flooding - Flooding was observed by two of the five respondents, who reported flooding of landscaped areas, docks and boatsheds, once every 2-3 years in the winter. Importance rankings vary. The lake water level is controlled by an outlet. Lake water level fluctuates about 0-4 feet per year.
- Fish Kills – One of the five respondents observed occasional fish kills. Importance rankings vary.
- Algae Blooms – Three of the five respondents observed signs of algae blooms. Conditions were reported in warm summer months, after sunny/dry periods. No respondents were aware of notifications of toxic algae blooms posted for this lake. Importance rankings vary.
- Water Quality - One of the five respondents reported cloudy water in the summer, less than once every 3 years. Importance rankings vary.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: None of the respondents use fertilizer. Two respondents have natural vegetation on the shoreline, and two have beach shoreline. None of the respondents might consider planting native vegetation along the lake front to protect and improve water quality.
- Septic Systems: Three of the five respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: None of the five respondents is involved in a community lake management group.
 - *Interest in becoming involved in a group*: None of the five respondents is interested in becoming involved in a new community lake management group.
 - *Amount willing to contribute*: Two respondents are willing to pay \$10 to \$100 per year for new lake management measures.

Tanwax Lake

The GIS query identified 87 parcels within the 200-foot buffer of Tanwax Lake. Questionnaires were sent to the owners of these parcels. Thirteen responses were received, for a response rate of approximately 15 percent.

Public Access and Uses

Tanwax Lake is accessible to the public from a boat ramp, public dock, park and beach. The lake is used for boating/waterskiing, swimming, and fishing.

Reported Problems

The following problems were identified by the thirteen survey respondents:

- Flooding - Flooding was observed by three of the 13 respondents, who reported flooding of docks and boatsheds, one or two times per year, in the fall or winter. Importance rankings vary. The lake water level is affected by beaver activity. Lake water level fluctuates about 0-4 feet per year.
- Fish Kills – Six of the 13 respondents observed occasional fish kills. All respondents ranked fish health as very important or important.
- Algae Blooms – Eight of the 13 respondents observed signs of algae blooms. Conditions were reported in warm summer months, after sunny/dry periods. None of the respondents were aware of notifications of toxic algae blooms posted for this lake. Importance rankings vary.
- Aquatic Weeds – Twelve of the 13 respondents reported moderate to dense water weeds. Seven respondents reported that weed growth has interfered with use of the lake, each year. Three reported interference with lake use. Observations of weed growth increases/decrease vary. Importance rankings vary.
- Water Quality – Five of the 13 respondents reported cloudy water, one reported septic failure/seepage, and one reported manure/animal waste (goose and duck feces). All respondents ranked water quality as very important or important.
- Other Comments – One respondent indicated that the beaver dam at outflow is a constant problem – volunteers bust it up and the beavers rebuild. Another respondent was concerned with trash dumped in the lake.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Ten of the 13 respondents do not use fertilizer, one uses organic fertilizer, and two use chemical fertilizer. Those who use fertilizer have various application frequencies. Eleven respondents have natural vegetation on the shoreline; two have beach/bulkhead shoreline. Six respondents might consider planting native vegetation along the lakefront to protect and improve water quality.

- Septic Systems: Eleven of the 13 respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: One of the thirteen respondents is involved in a community lake management group (contact info not listed).
 - *Interest in becoming involved in a group*: Three respondents are interested in becoming involved in a new community lake management group.
 - *Amount willing to contribute*: One respondent is willing to pay \$100 to \$500 per year, and six are willing to pay \$10 to \$100 per year for new lake management measures.

Twin Lake

The GIS query identified twenty-two parcels within the 200-foot buffer of Twin Lake. Questionnaires were sent to the owners of these parcels. Six responses were received, for a response rate of approximately 27 percent.

Public Access and Uses

Twin Lake is not accessible to the public. The lake is used for boating/waterskiing, swimming, and fishing.

Reported Problems

The following problems were identified by the six survey respondents:

- Flooding - Flooding was observed by three of the six respondents, who reported flooding of landscaped areas, docks and boatsheds, several times per year, in the spring, fall and winter. Importance rankings vary. The lake water level is controlled by an outlet, operated/maintained by Pierce County. Lake water level fluctuates about 0-2 feet per year.
- Algae Blooms – Three of the six respondents observed signs of algae blooms. Conditions were reported in warm summer months, after sunny/dry periods, and after rainy/wet periods. No respondents were aware of notifications of toxic algae blooms posted for this lake. All respondents ranked algae blooms as very important or important.
- Aquatic Weeds – Three of the six respondents reported moderate or dense water weeds, and two respondents reported that water weeds interfere with use of the lake.

Observations of weed growth increases/decrease vary. All respondents ranked aquatic weeds as very important or important.

- Water Quality - One of the six respondents reported cloudy water. All respondents ranked water quality as very important.
- Other Comments: One respondent is concerned about the beaver dam which stops the flow from Upper Twin to Lower Twin Lake.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Four of six respondents do not use fertilizer, and two use chemical fertilizer. Those who use fertilizer have various application frequencies. Two respondents have natural vegetation on the shoreline, and one has a landscaped shoreline, and two have bulkheads. Three respondents might consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Four of six respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary, but all are in good condition.
- Lake Management Community Groups:
 - *Existing Groups*: None of the six respondents is involved in a community lake management group.
 - *Interest in becoming involved in a group*: Four respondents are interested in becoming involved in a new community lake management group.
 - *Amount willing to contribute*: One respondent is willing to pay to pay \$10 to \$100 per year for new lake management measures.

Whitman Lake

The GIS query identified 77 parcels within the 200-foot buffer of Whitman Lake. Questionnaires were sent to the owners of these parcels. Eight responses were received, for a response rate of approximately 10 percent.

Public Access and Uses

Whitman Lake is accessible to the public from a boat ramp. The lake is used for boating/waterskiing, swimming, and fishing.

Reported Problems

The following problems were identified by the eight survey respondents:

- Flooding - Flooding was observed by seven of the eight respondents, who reported flooding of residential structures, landscaped areas, docks and boatsheds, several times per year, all year round. Importance rankings vary. The lake water level is controlled by an outlet. Lake water level fluctuates about 0-6 feet per year.
- Fish Kills – Three of the eight respondents observed occasional fish kills. All respondents ranked fish health as very important or important.
- Algae Blooms – All eight respondents observed signs of algae blooms. Conditions were reported in warm summer months, after sunny/dry periods. None of the respondents were aware of notifications of toxic algae blooms posted for this lake. All respondents ranked algae blooms as very important or important.
- Aquatic Weeds – All eight respondents reported moderate or dense water weeds. Four respondents reported that water weeds interfere with use of the lake. One reported dense water weeds. Three reported interference with lake use. Observations of weed growth increases/decrease vary. Importance rankings vary.
- Water Quality - Three of the eight respondents reported cloudy water, two reported septic failure/seepage and manure/animal waste. All respondents ranked water quality as very important or important.
- Other Comments: Other concerns include increase in power boats contributing oil and gas to the lake, septic systems in low bank areas, misuse of fertilizer, beaver dams, and elimination of natural habitat.

Lake Management Issues

- Fertilizer and Lakeshore Habitat: Five of the eight respondents do not use fertilizer, two use organic fertilizer, and one uses both organic and chemical fertilizer. Those who use fertilizer have various application frequencies. Five respondents have natural vegetation on the shoreline, two have landscaped shorelines, and four have bulkheads. Five respondents might consider planting native vegetation along the lakefront to protect and improve water quality.
- Septic Systems: Seven of the eight respondents indicated a septic system on the property. Frequency of pumping and age of septic system vary. Six septic systems are reported to be in good condition and one is in medium condition.

- Lake Management Community Groups:
 - *Existing Groups:* Three of the eight respondents are involved in a community lake management group, the Lake Whitman Improvement Club, Patrick McNeley, President, 360-879-5600.
 - *Interest in becoming involved in a group:* Four respondents are interested in becoming involved in a new community lake management group.
 - *Amount willing to contribute:* One respondent is willing to pay \$100 to \$500 per year, and four are willing to pay \$10 to \$100 per year for new lake management measures.

Questionnaire Instructions

Pierce County Surface Water Management is developing a basin plan for the Nisqually River Basin. Basin plans identify actions necessary to provide safe storm drainage, reduce flooding, maintain water quality and protect natural streams and lakes and the fish and wildlife they support. This questionnaire is intended to collect information about the lakes in the basin. We have sent this questionnaire to you because our records indicate that you own property on or close to a lake.

Your response to this questionnaire will help the planning process by providing valuable information on site specific problems. Feel free to make copies of this questionnaire to describe problems at multiple locations, or call (253) 798 - 6793 for additional copies.

After filling out questionnaire, please fold along dashed lines and mail to Pierce County.

Please return your questionnaire by _____ . Thank you very much!

For project info, please call: Roy Huberd, Pierce County Surface Water Management (253) 798-6793
Randy Brake, Pierce County Surface Water Management (253) 798-4651

or

Mike Milne, Brown and Caldwell, (206) 749-2284

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Public Works and Utilities
Surface Water Management
Postage Stamp
9850 64th Street West
University Place, WA 98467-1078

Bulk Rate

Pierce County Surface Water Management
ATTN: Roy Huberd or Randy Brake
9850 64th Street West
University Place, WA 98467-1078

-----*fold line*-----

(outside of tri-fold)



Pierce County
Public Works and Utilities
Water Programs Division

WATER

WATER

WATER

Nisqually Basin Plan

NISQUALLY BASIN PLAN - 2007 LAKE QUESTIONNAIRE

Contact Information (Not required, but helpful if we have questions about the problems you describe)

Name: _____ Can we contact you? Yes No
 Address: _____ If Yes, which do you prefer?
 _____ Phone Mail In-person E-mail
 Phone: _____ E-Mail Address: _____

Name of Lake: _____

Lake Access

Who owns the lake? <input type="checkbox"/> Private Resident(s) <input type="checkbox"/> City <input type="checkbox"/> State <input type="checkbox"/> County <input type="checkbox"/> I don't know	Is there public access to the lake? <input type="checkbox"/> Boat Ramp <input type="checkbox"/> Park <input type="checkbox"/> None <input type="checkbox"/> Public Dock <input type="checkbox"/> Beach
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Lake Use

What do you use the lake for? <input type="checkbox"/> Boating/Waterskiing <input type="checkbox"/> Swimming <input type="checkbox"/> Commercial Ventures <input type="checkbox"/> Fishing <input type="checkbox"/> Other _____ <input type="checkbox"/> Irrigation	How often do you use the lake? <input type="checkbox"/> Many times per year <input type="checkbox"/> Once every 2 to 3 years <input type="checkbox"/> Several times per year <input type="checkbox"/> Less than once every 3 years <input type="checkbox"/> 1 or 2 times per year
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Lake Water Level Control

Is lake level controlled by a man-made structure? _____ If yes, what kind? <input type="checkbox"/> Stop-log <input type="checkbox"/> Outlet <input type="checkbox"/> Weir <input type="checkbox"/> Other _____	Who operates or maintains the structure? _____	How much does the lake water level fluctuate during the year? <input type="checkbox"/> 0-2 feet <input type="checkbox"/> 4-6 feet <input type="checkbox"/> 2-4 feet <input type="checkbox"/> Other _____
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Flooding

Flooding problems you have observed (check all that apply): <input type="checkbox"/> Flooding of residential structures <input type="checkbox"/> Flooding of landscaped areas <input type="checkbox"/> Flooding of docks, boat sheds, etc. <input type="checkbox"/> Other _____	Flooding occurs under what conditions? <input type="checkbox"/> Long rainstorms <input type="checkbox"/> Short, intense storms <input type="checkbox"/> Multiple consecutive storms <input type="checkbox"/> Other _____	What season do the flooding problems occur? <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Fall <input type="checkbox"/> Winter
Frequency of flooding problems: <input type="checkbox"/> Several times per year <input type="checkbox"/> 1 or 2 times per year <input type="checkbox"/> Once every 2 to 3 years <input type="checkbox"/> Less than once every 3 years	Approximate dates and durations of problems, if known:	Describe nature and extent of flooding problems:

Do you have photos of past flooding? Yes No

Fish Species

What kinds of fish are in the lake? <input type="checkbox"/> Trout <input type="checkbox"/> Bass <input type="checkbox"/> Salmon <input type="checkbox"/> Perch <input type="checkbox"/> Other _____	Have you observed any fish kills? <input type="checkbox"/> Occasional dead fish <input type="checkbox"/> Frequent dead fish <input type="checkbox"/> Mass fish kills	From what you've observed, are fish populations: <input type="checkbox"/> Increasing <input type="checkbox"/> Steady <input type="checkbox"/> Decreasing <input type="checkbox"/> Can't tell
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Algae Blooms

Have you observed any of the following indications of algae blooms? <input type="checkbox"/> Lake looks green (like pea soup)	Have notifications of toxic algae blooms been posted for this lake? <input type="checkbox"/> Yes, several times	When have algae blooms occurred? (check all that apply) <input type="checkbox"/> Warm summer months
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<input type="checkbox"/> Areas of cloudy blue-green water <input type="checkbox"/> Surface scum (green, blue, white) <input type="checkbox"/> Strong odors, decomposition <input type="checkbox"/> None; clear water	<input type="checkbox"/> Yes, a few times <input type="checkbox"/> Yes, once before <input type="checkbox"/> None that I'm aware of <input type="checkbox"/> If yes, by whom? _____	<input type="checkbox"/> Cool winter months <input type="checkbox"/> Following sunny dry periods <input type="checkbox"/> Following wet/rainy periods
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Aquatic Weeds

Are water weeds present in the lake or outlet channel (other than algae)? <input type="checkbox"/> Dense <input type="checkbox"/> Moderate <input type="checkbox"/> Low What kinds (if known)? _____	Has weed growth interfered with your use of the lake? <input type="checkbox"/> Yes <input type="checkbox"/> No How often? _____	Has weed growth: <input type="checkbox"/> Increased over the past 15 years <input type="checkbox"/> Decreased over the past 15 years <input type="checkbox"/> Stayed the same over the past 15 years
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Water Quality

Describe water quality problems you have observed (check all that apply) <input type="checkbox"/> Cloudy water <input type="checkbox"/> Septic failure/seepage <input type="checkbox"/> Manure/animal waste <input type="checkbox"/> Pets sick after drinking <input type="checkbox"/> Other _____	What season do the problems occur? <input type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> Fall <input type="checkbox"/> Winter	Frequency of problems: <input type="checkbox"/> More than once per year <input type="checkbox"/> Every year <input type="checkbox"/> Once every 2 to 3 years <input type="checkbox"/> Less than once every 3 years
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Fertilizer and Lakeshore Habitat

What kind of fertilizer do you use on your lawn and/or garden? <input type="checkbox"/> Organic/Manure <input type="checkbox"/> Chemical <input type="checkbox"/> Both <input type="checkbox"/> None	How often do you apply fertilizers? <input type="checkbox"/> More than four times a year <input type="checkbox"/> Four times a year <input type="checkbox"/> Twice a year <input type="checkbox"/> Once a year <input type="checkbox"/> Less than once a year	What time of year do you usually apply fertilizer? <input type="checkbox"/> Early Spring <input type="checkbox"/> Late Spring <input type="checkbox"/> Late Summer <input type="checkbox"/> Fall	Which best describes the shoreline vegetation on your property? <input type="checkbox"/> Landscaped <input type="checkbox"/> Natural Vegetation <input type="checkbox"/> Beach <input type="checkbox"/> Bulkhead <input type="checkbox"/> Other _____
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Native vegetation along the lake shore can help prevent fertilizers, bacteria, and other pollutants from entering the lake and causing problems, such as excessive growth of algae and invasive weeds. Would you consider planting native vegetation along your lake front to protect and improve water quality?
 Yes Maybe No

Septic System

Is there a septic system on your property? <input type="checkbox"/> Yes <input type="checkbox"/> No. If yes, how far is drainfield from lake? _____			
Do you have any problems with your septic system? <input type="checkbox"/> Odor <input type="checkbox"/> Surface Discharge <input type="checkbox"/> Clogging <input type="checkbox"/> Other _____	How often do you have it pumped? <input type="checkbox"/> Every 1-3 years <input type="checkbox"/> Every 3-5 years <input type="checkbox"/> Every 6-10 years <input type="checkbox"/> Every 10 years <input type="checkbox"/> Never	How old is your septic system? <input type="checkbox"/> 1 – 10 years <input type="checkbox"/> 10 – 15 years <input type="checkbox"/> 15 – 20 years <input type="checkbox"/> 20+ years <input type="checkbox"/> I don't know	What condition is your septic system in? <input type="checkbox"/> Good <input type="checkbox"/> Medium <input type="checkbox"/> Poor <input type="checkbox"/> I don't know

Lake Management Community Groups

Do you contribute to or are you involved in a group associated with the lake? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, list group name and contact info: _____ _____ _____	Would you be interested in becoming involved in a new community group that addresses issues in the lake? <input type="checkbox"/> Yes <input type="checkbox"/> No
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If this study finds that additional measures are needed to protect your lake, how much would you be willing to pay for new lake management measures?: None \$10 to \$100/yr \$100 to \$500/yr \$500 to \$1,000/yr More than \$1,000/yr

IMPORTANCE OF LAKE ISSUES Please rank the following in order of importance from 1 to 4, where:

1 = Very Important, 2 = Important, 3 = Somewhat important, 4 = Least important. Please circle the ranking number for each issue.

Issue	Rating					Issue	Rating			
Water Quality	1	2	3	4		Algae Blooms	1	2	3	4
Flooding	1	2	3	4		Water weeds	1	2	3	4
Fish Health	1	2	3	4		Fertilizer Use	1	2	3	4
Lake Level	1	2	3	4		Septic System Use	1	2	3	4

Please use the space below to describe any concerns or problems not listed above.
