

King County Lake Monitoring Report

Lake Stewardship Program



Volunteer Lake Monitoring Results for the Water Year 2003

 **King County**
March 2005

King County Lake Monitoring Report

Volunteer Lake Monitoring Results for Water Year 2002–2003



March 2005



King County

Department of Natural Resources and Parks

Water and Land Resources Division

Lake Stewardship Program

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Participating Volunteers



Many individuals have contributed to the collection of lake volunteer monitoring data. Special thanks to our dedicated volunteers, many of whom have participated for several years. The success of this program is dependent upon their diligent and dedicated efforts.

Alice	Level II: Jenny Emsky
Allen	Levels I & II: David & Betty Burton
Ames	Levels I & II: Bob Young
Angle	Level I: Diane & Alden Chace, Level II: Edward & Jeannie Montry
Beaver-1	Level II: Donna Carlson
Beaver-2	Level I: Al & Shirley Jokisch; Level II: Larry Miller; Backup Volunteer: Ray Petit
Bitter	Level II: Tom & Danae Hollowed
Boren	Level I: Mary Alice & Eric Root; Level II: Ray Clark
Burien	Level II: Steve Locher
Clark	Level II: Jennifer Byrne, Sarah Bly, Shelley Fravel, Matt Knox, Chris Mason, Tom Records & Scott Schroeder
Cottage	Levels I & II: Ed Grubbs; Backup Volunteer: Ann Whitney
Desire	Level I: Ed & Min Merrill; Level II: Jan Falkenhagen; Backup Volunteers: Jim & Betsy Locatelli
Echo (Shoreline)	Level I: Angelique Nektas; Level II: Barbara Guthrie

Fenwick	Level II: Jennifer Byrne, Sarah Bly, Shelley Fravel, Matt Knox, Chris Mason, Tom Records & Scott Schroeder
Fivemile	Level II: Janet Gillies
Francis	Levels I & II: Brian Moriarty
Geneva	Level I: Sue Yunker-Jones & Thomas Jones; Level II: Bruce Harpham & Laura Stiles
Grass	Levels I & II: Kathryn Howard
Haller	Levels I & II: Rud Okeson; Backup Volunteers: Rick Ehle & Barbara Gross
Horseshoe	Level I: Frank Douglas; Level I & II: Eric Olsgaard
Jones	Level I & II: Dale & Linda Anson
Joy	Levels I & II: Bob & Sam Charles
Kathleen	Levels I & II: Keith Lanan; Backup Volunteer: Kurt Tokita
Killarney	Level I: Kenna Patrick; Level II: Craig Rice
Langlois	Levels I & II: Denise Mahnke
Leota	Level I: David Mangels; Level I & II: Rick Sampson
Lucerne	Level II: Milo Dullum
Marcel	Levels I & II: Chuck Willis; Backup Volunteer: Andy Wones
Margaret	Levels I & II: Douglas Johnston; Backup Volunteer: Meredith Mitchell
McDonald	Level I: Suzanne & Jeff Lowry; Level II: Burt & Marty Sweet
Meridian	Level I: Kathe Dizard; Level II: Al Flores
Mirror	Levels I & II: Bob Roper; Backup Volunteers: John & Pat Hardman
Morton	Level I: Marty & Sandy Landers; Level I & II: Paul & Laura Mueller; Backup Volunteer: Dick Balash
Neilson (Holm)	Levels I & II: Kevin & Kurtis Schultz

North	Levels I & II: Robin & Tim Cook, Chuck Gibson, Debra Hansen, Wendy Honey & Lynn Naumann
Paradise	Levels I & II: Shirley Egerdahl
Peterson Pond	Level I: Karen Tomfohrde
Pine	Levels I & II: Kate Bradley
Pipe	Level I: Ralph Beede; & Don Davenport; Level II: Bob Brenner
Ravensdale	Level II: Kim Madison
Sammamish	Level I: Pam Monger, Reid Brockway & Mike Schmidt
Sawyer	Level I: John Davies; Levels I & II: Glenn Ross; Backup Volunteer: Wilmur (Bill) Davis
Shadow	Level I: Billy Aliment; Level II: Jake Finlinson
Shady	Levels I & II: Ray Konecke
Spring	Level I: Bob Keller; Level II: Caren Adams
Star	Level II: Mark Baughman
Steel	Levels I & II: Susan Pearson
Twelve	Levels I & II: Brenda & Jim Sherwood
Twelve	Levels I & II: Jan Delacy; Backup Volunteers: Cathy & Dean Voelker
Union	Level I: Ingrid Rasch, Betty Swift & Van Woods
Walsh	Level II: Tina Miller & Harry Morgan
Welcome	Levels I & II: Dave Hadley
Wilderness	Levels I & II: Ray Petit; Backup Volunter: John Vasboe
Yellow	Levels I & II: Shelley Dahlgren, Steve Paoletti, Meg Pearson, Karen May & Lyle Whitcomb



Contributors

Special thanks to the staff involved in the administration, training, volunteer coordination, and equipment management of the lake volunteer monitoring program. Staff efforts include data reduction and management; laboratory analysis, quality assurance and data verification; data analysis; technical writing; and report production. The following individuals contributed significantly to the volunteer monitoring program and production of this report:

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Purpose of the Program

The Lake Stewardship Program focuses on the small lakes in King County, managing and implementing restoration and aquatic weed eradication projects, as well as collaborating with volunteer monitors to meet other program objectives, which include: (1) gathering reliable, cost-effective baseline data and assessing long-term trends, particularly for lakes that do not have other organized assessment efforts focused on them; (2) defining seasonal and water column variability in lakes over time to establish normal ranges; (3) identifying potential problems, proposing possible management solutions and alternatives, or pinpointing additional studies to be made to accomplish such goals; (4) educating lake residents, lake users, and policy makers regarding lake water quality and its protection, as well as human impacts and solutions; and (5) providing a solid foundation of knowledge that can be used for long-term stewardship of King County lakes.

The intent of the annual report is to provide citizens, scientists, managers, and other interested individuals with current, quality-controlled information on water quality and water level fluctuations for the monitored bodies of water. All data is available for assessment purposes and for use in addressing many questions regarding characteristics of specific lakes. The information presented in this report can both suggest and guide protective management and stewardship activities at participating lakes, as well as provide some reliable data to aid in the production of a comprehensive Lake Management Plan, which may be deemed necessary for some types of grants and permits.

Monitoring Program

Two levels of participation are offered to citizen volunteers. The Level I program measures daily precipitation and water levels of the lakes, in addition to surface water temperatures, and Secchi depths. The Level II program includes the collection of water

samples for laboratory analysis of total phosphorus, total nitrogen, chlorophyll *a*, and phytoplankton, as well as the measurement of water temperatures and Secchi depths.

Precipitation was below the 50-year average in water year 2003 for the Sea-Tac weather station. Records of rainfall were kept for at least part of the year at 38 lakes, including Lake Sammamish. Of these, 23 were sufficient to estimate yearly accumulation totals. Water level data were collected for 39 lakes, of which 29 had enough data to evaluate seasonal variation and response to large-scale rainfall events. Most lakes followed a pattern of annual high winter levels, dropping through the summer to a minimum stand in early autumn, but there are several exceptions to this pattern. Many showed quick response times to large storm events in the wet season.

Water quality was rated by trophic state or degree of biological activity (Carlson 1977). Lakes were classified into three levels from low to high productivity: oligotrophic, mesotrophic and eutrophic. In 2003, all of the 51 lakes with Level II monitors had sufficient data to rate their trophic states. Of these, 11 lakes were rated oligotrophic, six were borderline oligotrophic to mesotrophic, 22 were mesotrophic, five were borderline mesotrophic to eutrophic, and seven were eutrophic. Details on regional assessments will be found in Section 2, and specific details on each lake will be found in Section 3. Many lakes that have been sampled for multiple years have retained the same rating over time.

Detailed phytoplankton analyses were completed for selected dates in 2003, adding an additional source of information to the database and providing another way to assess the health and character of the ecosystems and water quality of the monitored lakes.

Program Thanks and Outlook

We want to thank the more than 100 volunteer lake monitors who take the time to collect information on their lakes through the year and who track conditions closely, letting us know about unusual occurrences and events.

The Lake Stewardship Program at King County has undergone many changes over the past several years, and more changes may occur as King County restructures its budget and evaluates the services it provides. However, we are committed to keeping the primary goals of the program consistent: to monitor as many small lakes in the county as possible within our allotted budget and program definition; to summarize all findings for use by citizens, groups and jurisdictions in planning for lake protection and stewardship; to make suggestions for action when appropriate; and to provide technical support and limnological advice in response to requests from groups and individuals.