2014

Deicer Storage Tank Replacement and Containment Plan

Maintenance Operations

2013-15
Deicer Storage Tank Replacement and Containment Plan

Summary

For the 13-15 Biennium the Highway Maintenance Operations Division will replace liquid deicer chemical storage tanks that are 14 years old and older. Statewide, 38 tanks meet the criteria, as shown in ***Figure 1*** (pg. 3). The estimated cost for this work is $380,000 and will be funded out of each region's 13-15 biennial Snow and Ice Budget.

In addition, secondary containment will need to be constructed at eight locations around the state, based on the priority information shown in ***Figure 2*** (pg. 4). The estimated cost for this work is $120,000 and will also be funded out of each region's 13-15 biennial Snow and Ice Budget.

Background and Current Situation

Over the last several biennia, WSDOT Maintenance Operations has built an inventory of 235 liquid deicer storage tanks around the state. As that inventory has aged and environmental requirements have changed, it is necessary to address the expanded containment, maintenance and timely replacement of the storage tank inventory.

While a liquid deicer chemical storage tank's useful life can vary based on a number of factors, current industry guidelines recommend considering tank replacement every 12 to 15 years. Based on the chart shown in ***Figure 1*** (pg. 3), there are approximately 57 tanks that are within that threshold, and another 56 that are approaching that threshold. In order to reduce the risk of tank failure it is important to have a systematic and structured replacement plan in place.

Approximately two-thirds of the storage tanks currently have appropriate secondary containment. While all locations do not require secondary containment, it should be provided for those tanks located in in NPDES areas (urban areas with a population of 50,000 or more) and in other higher-risk locations. ***Figure 3*** (pg. 4) prioritizes the locations where additional secondary containment should be provided over time.

Risk

Failure to maintain or replace aged storage tanks could result in a catastrophic tank failure, potentially contaminating the surrounding environment. Additionally, there would be costs for cleanup, mitigation, product replacement, and the need to install further preventative measures.

Goals

1) Replace liquid chemical deicer storage tanks that are past their useful life, and those that show excessive wear or signs of impending failure.

2) Construct secondary containment for existing tanks that are in higher-risk areas and lack such containment. Secondary containment is currently only required in NPDES areas and in locations with sensitive waterways. However, it is also important to prevent spills at all WSDOT facilities and their surrounding environment.

To accomplish these goals, the following issues should be addressed:

- Establish a policy or expectation to replace those tanks that have reached the end of their useful life. It is recommended that existing Snow & Ice Control allocations be used to address this need.
- Incorporate a sustainable asset replacement plan for replacing future deicer tanks as they exceed their life expectancy.
- Prioritize the list of tanks that need to be replaced based on a coordinated effort with the regions, incorporating issues such as age, location, an inspection of the tank, UV exposure, wall thickness, etc.
- Ensure flexibility in the plan for emergent needs.
- Standardize the specifications for all new deicer tanks to be purchased.
- Move tanks only when prudent, as this impacts the life expectancy of the tank.
- Prioritize the locations that need secondary containment, based on
    1) tanks located in NPDES areas
    2) tanks located in higher risk areas
    3) tanks located in lower risk areas.
- Research and evaluate inspection/tank management software to track inspections and monitor tank condition and life cycle.

Assumptions for storage tank needs and solutions

The life expectancy for a liquid deicer chemical storage tank depends on a number of factors, including the effect of the sun's ultraviolet (UV) damage breaking down the plastic on the outside of the tank, the wall thickness of the tank, the type of fittings used, and whether the tank had a cover. Tanks that are stored under cover are assumed to have a longer life span. The current industry recommendation for life expectancy is in the 12-15 year range.

Typically, tank costs are $1,000 per 1,000 gallons, so a 10,000 gallon tank will cost approximately $10,000, inclusive of shipping and site delivery costs.

The average secondary containment vessel costs approximately $15,000 to construct. Current tank sizes vary due to the regional facility foot print and the needs at the time of purchase. Standardizing the tank size will provide a level playing field.

Age & Replacement Costs of Liquid Chemical Storage Tanks

Storage Tank Age (in years)	Number of Tanks	Cost of Tank Replacement
16+	13	$130,000
15	8	$80,000
14	17	$170,000
13	18	$180,000
12	1	$10,000
11	56	$560,000
10	13	$130,000
9-	109	$1,090,000
Figure 1	**235**	**$2,350,000**

**Does not include 5 rental tanks*

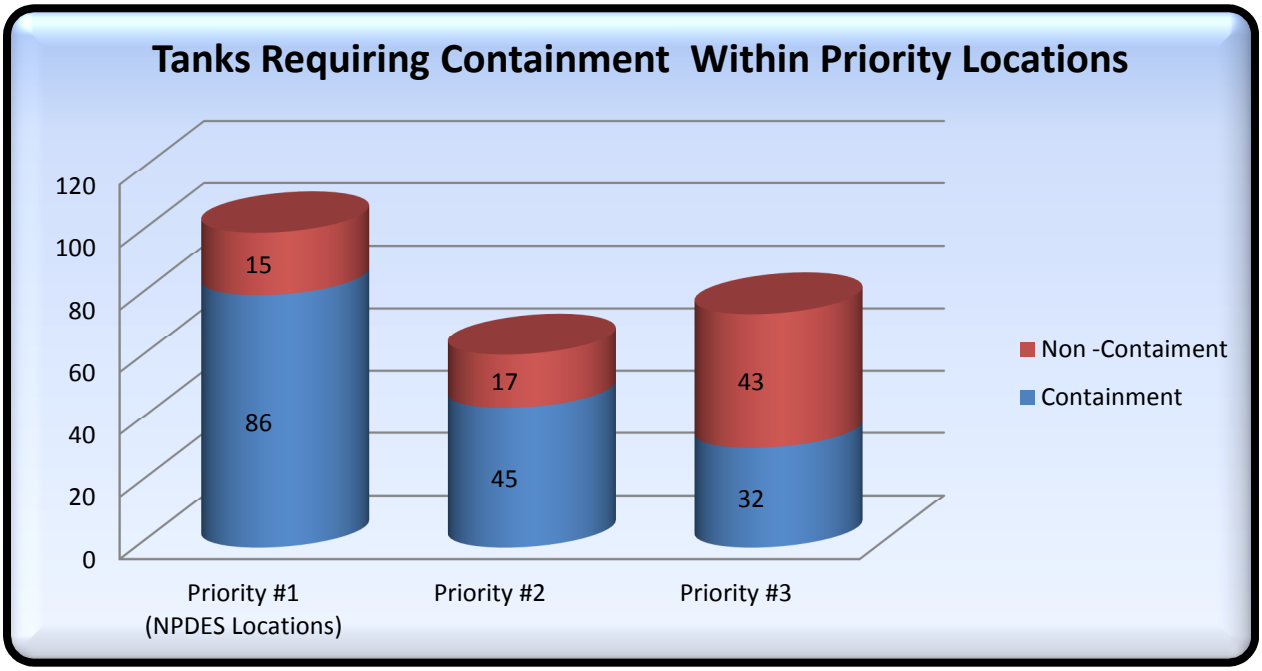
<u>Plan Moving Forward</u>

In order to begin the process of systematically replacing aged tanks, this information was discussed with the Region Maintenance Engineers in June 2013. The decision was reached to replace all tanks 14 years and older in the 2013-15 biennium. This will result in approximately 38 of 235 tanks being replaced in the 13-15 biennium, at an estimated cost of approximately $380,000. This work will be funded out of each region's 13-15 biennial Snow and Ice allocation. The lists in the appendix of this document identify those tanks by location and age. If there are mitigating circumstances by which the listed tanks should be extended beyond the 14 year target, or if there are younger tanks that should be replaced in lieu of what is shown, those circumstances should be communicated with HQ Maintenance on a case-by-case basis and the tank list reprioritized as appropriate.

This pattern of replacement will occur on a biennial basis to ensure all aged tanks are replaced in a systematic manner over time.

In the same way, secondary containment shall be provided based on the priority approach described herein. As a result, it is anticipated that in the 13-15 biennium, additional

secondary containment will be constructed for 8 of the 15 tanks at the high priority NPDES locations around the state, with a cost of $120,000.



**There are two additional portable tanks that are not part of this graph*

Figure 2

Additional Containment Needed Within NPDES Sites

Region	Area	Location
Northwest	5	Northup
North Central	2	Moses Lake
Olympic	2	Mullenix
Southwest	1	Fargher Lake
Southwest	3	Cathlamet
South Central	1	Elk Heights

Figure 3

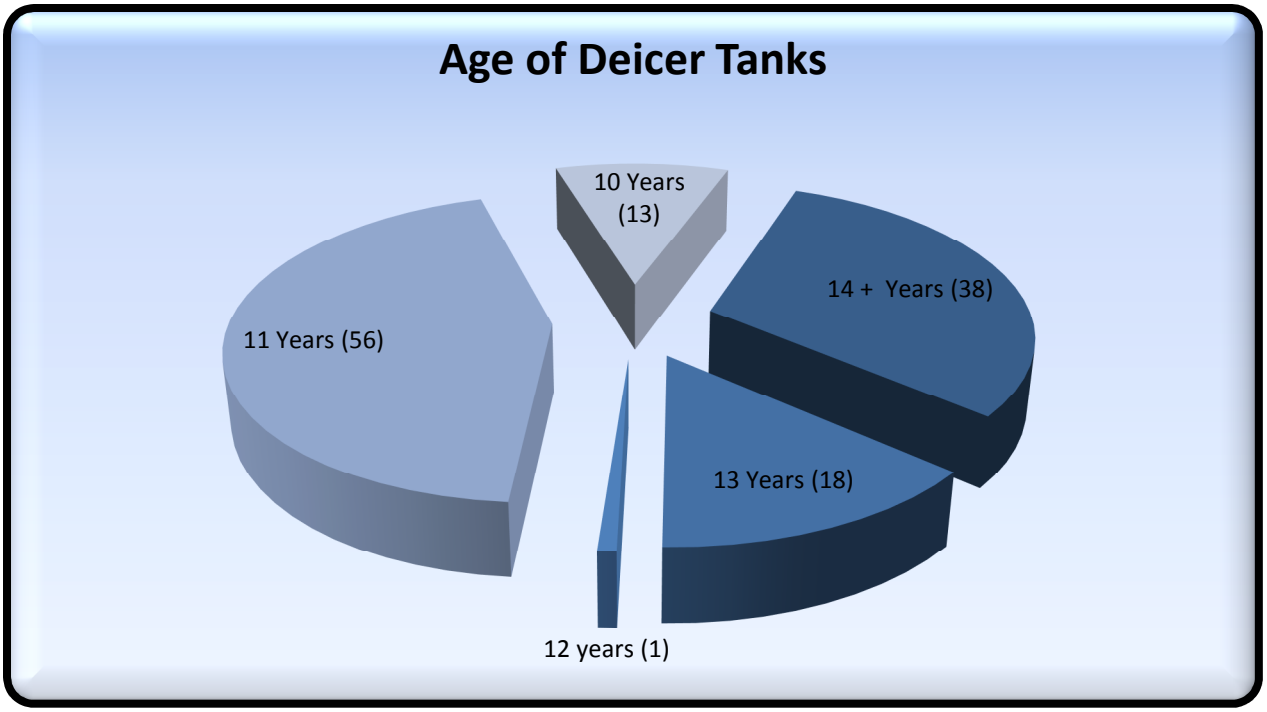


Figure 4

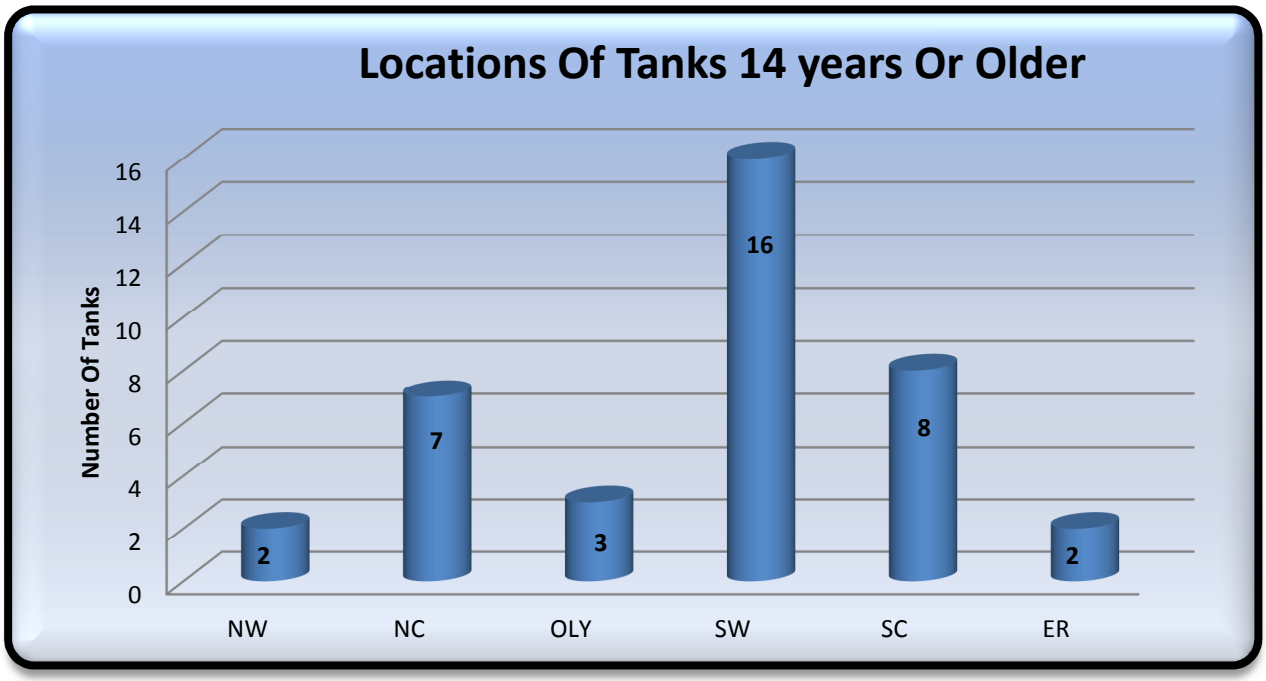


Figure 5

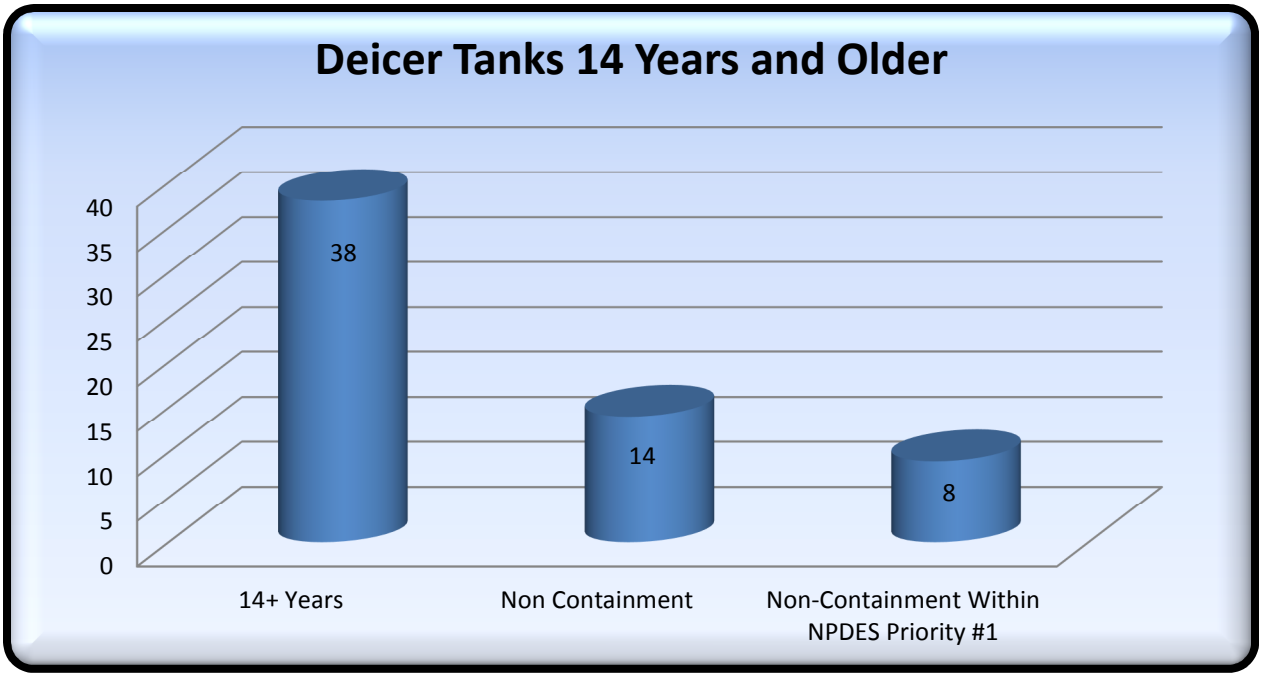


Figure 6

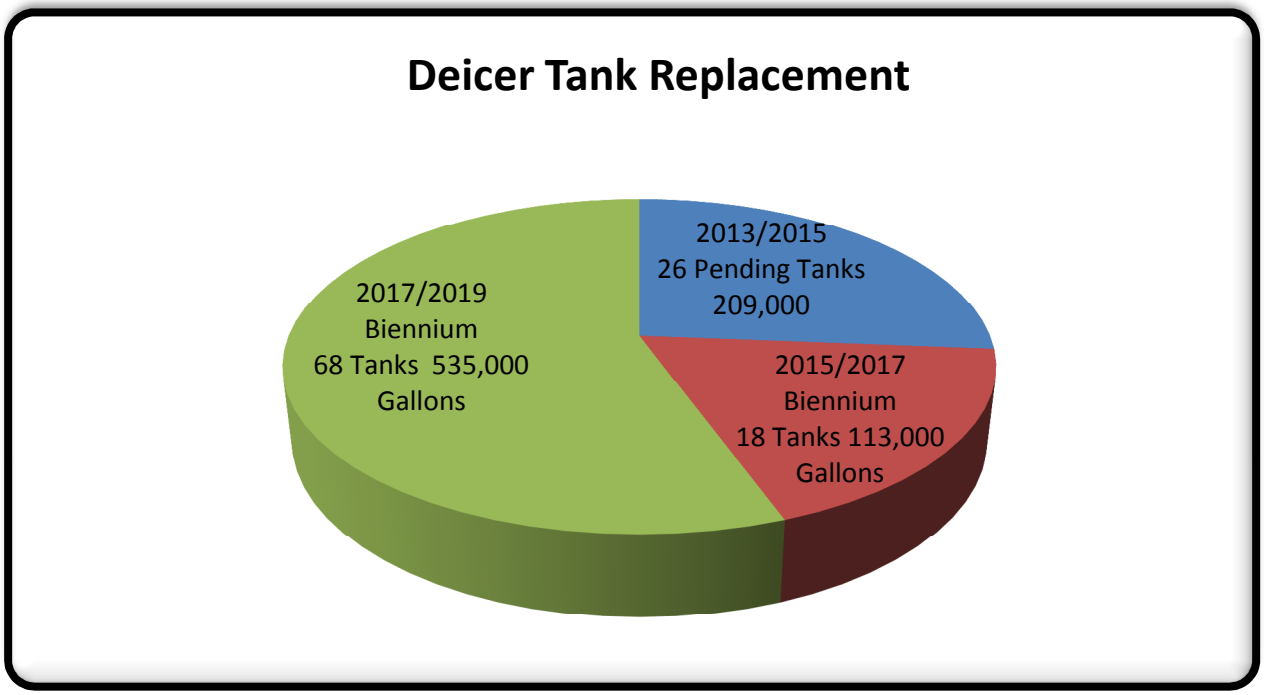


Figure 7

STATEWIDE DEICER STORAGE FACILITIES

Last Updated 11/5/2014

Current Year **2014**

NAME	Region Area	Liquid GAL	DOB	Age Of Tank	Containment Y/N
PINES	ER 1	10,000	1998	16	Y
PENRITH	ER 1	10,000	2002	12	N
PINES	ER 1	10,000	2008	6	Y
PINES	ER 1	10,000	2008	6	Y
PINES	ER 1	10,000	2008	6	Y
PINES	ER 1	10,000	2010	4	Y
PINES	ER 1	10,000	2010	4	Y
PINES	ER 1	10,000	2010	4	Y
GEIGER	ER 1	10,000	2012	2	Y
WANDERMERE	ER 1	10,000	2012	2	Y
PINES (being Replaced 2012)	ER 1	10,000	2013	1	Y
GEIGER	ER 1	10,000	2014	0	Y
COLFAX	ER 2	10,000	2003	11	Y
COLFAX	ER 2	10,000	2003	11	Y
PULLMAN	ER 2	10,000	2003	11	Y
PULLMAN	ER 2	10,000	2003	11	Y
OAKESDALE	ER 2	10,000	2003	11	N
ROSALIA	ER 2	10,000	2003	11	N
WASHTUCNA	ER 2	10,000	2003	11	N
WASHTUCNA	ER 2	10,000	2003	11	N
DAVENPORT	ER 3	10,500	2006	8	Y
DAVENPORT	ER 3	10,500	2006	8	Y
RITZVILLE	ER 3	10,000	2006	8	Y
RITZVILLE	ER 3	10,000	2006	8	Y
RITZVILLE	ER 3	10,000	2006	8	Y
RITZVILLE	ER 3	10,000	2006	8	Y
ODESSA	ER 3	10,000	2006	8	N
SPRAGUE	ER 3	10,000	2006	8	N
SPRAGUE	ER 3	10,000	2006	8	N
WILBUR	ER 3	10,000	2006	8	N
WILBUR	ER 3	10,000	2006	8	N
COLVILLE	ER 4	10,000	2004	10	Y
IONE	ER 4	10,000	2004	10	Y

GROUSE CREEK	ER 4	10,000	2004	10	N
HUNTERS	ER 4	10,000	2004	10	N
NORTHPORT	ER 4	10,000	2004	10	N
ORIENT	ER 4	10,000	2004	10	N
REPUBLIC	ER 4	10,000	2004	10	N
COLVILLE	ER 4	10,000	2009	5	Y
COLVILLE	ER 4	10,000	2009	5	Y
COLVILLE	ER 4	10,000	2009	5	Y
BLEWETT	NCR 1	6,000	1998	16	N
CHELAN	NCR 1	6,000	1998	16	N
WENATCHEE	NCR 1	10,000	1998	16	N
WATERVILLE	NCR 1	10,000	1999	15	N
WENATCHEE	NCR 1	10,000	1999	15	N
BERNE	NCR 1	10,000	2002	12	N
BLEWETT	NCR 1	10,000	2002	12	N
CHELAN	NCR 1	10,000	2002	12	N
LEAVENWORTH	NCR 1	10,000	2003	11	Y
ORANDO	NCR 1	10,000	2008	6	N
OTHELLO	NCR 2	10,000	2002	12	Y
EPHRATA	NCR 2	10,000	2002	12	N
GEORGE	NCR 2	10,000	2002	12	N
GEORGE	NCR 2	10,000	2002	12	N
MOSES LAKE	NCR 2	10,000	2002	12	N
MOSES LAKE	NCR 2	10,000	2010	4	N
ELECTRIC CITY	NCR 3	6,000	2000	14	Y
ELECTRIC CITY	NCR 3	6,000	2000	14	Y
TWISP	NCR 3	10,000	2000	14	Y
BREWSTER	NCR 3	10,000	2000	14	N
OKANOGAN	NCR 3	10,000	2000	14	N
TONASKET	NCR 3	10,000	2000	14	N
COULEE CITY	NCR 3	10,000	2002	12	Y
MANSFIELD	NCR 3	10,000	2002	12	N
SHUKSAN	NWR 1	6,000	2002	12	Y
MAPLE FALLS	NWR 1	10,000	2002	12	N
MAPLE FALLS	NWR 1	5,000	2002	12	N
ALGER / BOWHILL	NWR 1	6,000	2002	12	N
BELLINGHAM	NWR 1	10,000	2002	12	Y

BELLINGHAM	NWR 1	10,000	2002	12	Y
BELLINGHAM	NWR 1	2,500	2002	12	Y
DEMING	NWR 1	9,000	2002	12	Y
ARLINGTON	NWR 2	5,000	2002	12	Y
COAL CREEK	NWR 2	4,000	2002	12	Y
COAL CREEK	NWR 2	4,000	2002	12	Y
HAZEL	NWR 2	3,000	2002	12	Y
MT VERNON	NWR 2	10,000	2002	12	Y
COUPEVILLE	NWR 2	7,000	2002	12	Y
HEICHEL	NWR 2	4,000	2002	12	Y
HAZEL	NWR 2	5,000	2007	7	Y
MONROE	NWR 3	10,000	2001	13	Y
EVERETT	NWR 3	250	2007	7	Y
EVERETT	NWR 3	10,000	2007	7	Y
EVERETT	NWR 3	10,000	2007	7	Y
SKYKOMISH	NWR 3	9,000	2007	7	Y
KENT	NWR 4	7,500	2007	7	Y
KENT	NWR 4	7,500	2007	7	Y
ENUMCLAW	NWR 4	1,000	2007	7	N
GREENWATER	NWR 4	10,000	2007	7	N
GREENWATER	NWR 4	5,000	2007	7	N
RENTON	NWR 4	1,000	2007	7	N
LAKE GENEVA	NWR 4	1,000	2007	7	N
PRESTON	NWR 5	6,500	1994	20	Y
NORTHUP	NWR 5	6,000	1998	16	N
PRESTON	NWR 5	7,000	2002	12	Y
NORTHUP	NWR 5	9,000	2002	12	N
BALLINGER	NWR 5	6,000	2003	11	Y
SPOKANE ST.	NWR 5	6,500	2013	1	N
LAKEVIEW	OR 1	2,500	2000	14	Y
ALDER	OR 1	2,500	2002	12	Y
ALDER	OR 1	7,500	2002	12	Y
LAKEVIEW	OR 1	5,000	2002	12	Y
MOTTMAN	OR 1	5,000	2002	12	Y
MOTTMAN	OR 1	5,000	2002	12	Y
LAKEVIEW	OR 1	9,500	2009	5	Y
YELM	OR 1	9500	2009	5	Y

LOFALL	OR 2	4,000	2000	14	N
LOFALL	OR 2	2,000	2000	14	N
SHELTON	OR 2	5,000	2002	12	Y
BELFAIR	OR 2	3,000	2002	12	N
MULLENIX	OR 2	10,000	2002	12	N
SHELTON	OR 2	5,000	2002	12	N
SHELTON	OR 2	5,000	2002	12	N
SHELTON	OR 2	2,500	2002	12	N
WALKER MT	OR 2	10,000	2002	12	N
WALKER MT	OR 2	2,500	2002	12	N
BELFAIR	OR 2	3,000	2002	12	N
ELWHA	OR 3	600	2000	14	N
HECKLESVILLE	OR 3	2,000	2002	12	N
FORKS	OR 3	10,000	2005	9	N
PORT ANGELES	OR 3	10,000	2008	6	Y
PORT ANGELES	OR 3	4,000	2008	6	Y
SEKIU	OR 3	6,500	2014	0	Y
DISCOVERY BAY	OR 3	4,000	2014	0	N
DISCOVERY BAY	OR 3	4,000	2014	0	N
CENTRAL PARK	OR 4	10,000	2006	8	Y
CENTRAL PARK	OR 4	6,000	2006	8	Y
ELMA	OR 4	10,000	2006	8	N
ELMA	OR 4	6,000	2006	8	N
AMANDA PARK	OR 4	6,500	2007	7	N
AMANDA PARK	OR 4	5,500	2007	7	N
Eli Hill	OR1	9,500	2009	5	Y
NARROWS BRIDGE	OR1	9,500	2009	5	Y
ELK HEIGHTS	SCR 1	9,000	1999	15	N
HYAK	SCR 1	10,500	2014	0	Y
HYAK	SCR 1	10,500	2014	0	Y
RYEGRASS	SCR 1	10,500	2014	0	Y
BULLFROG	SCR 1	15,000	2004	10	Y
ELLENSBURG	SCR 1	14,000	2004	10	Y
ELK HEIGHTS	SCR 1	9,000	2004	10	N
VANTAGE	SCR 1	10,000	2006	8	Y
VANTAGE	SCR 1	10,000	2006	8	Y
CAMP MASON	SCR 1	14,000	2011	3	Y

EASTON	SCR 1	10,000	2014	0	N
EAST SELAH	SCR 2	10,000	2003	11	Y
RIMROCK	SCR 2	10,000	2003	11	Y
TOPPENISH	SCR 2	9,000	2003	11	Y
RIMROCK	SCR 2	10,000	2005	9	Y
WHITE PASS	SCR 2	10,000	2006	8	Y
WHITE PASS	SCR 2	10,000	2006	8	Y
WHITE PASS	SCR 2	10,000	2006	8	Y
TOPPENISH	SCR 2	9,000	2008	6	Y
EAST SELAH	SCR 2	10,000	2013	1	Y
PASCO	SCR 3	10,500	2014	0	Y
PASCO	SCR 3	10,500	2014	0	Y
PROSSER	SCR 3	10,500	2014	0	Y
PROSSER	SCR 3	10,500	2014	0	Y
CONNELL	SCR 3	10,500	2014	0	N
ANATONE	SCR 4	10,000	2002	12	Y
CLARKSTON	SCR 4	10,000	2002	12	Y
WALLA WALLA	SCR 4	10,000	2002	12	Y
WALLA WALLA	SCR 4	10,000	2002	12	Y
DAYTON	SCR 4	10,000	2002	12	N
DAYTON	SCR 4	10,000	2002	12	N
POMEROY	SCR 4	10,000	2002	12	N
POMEROY	SCR 4	10,000	2002	12	N
PRESCOTT	SCR 4	9,000	2002	12	N
WALLULA	SCR 4	10,000	2002	12	N
WALLA WALLA	SCR 4	10,000	2009	5	Y
WALLA WALLA	SCR 4	10,000	2009	5	Y
VANCOUVER	SWR 1	9,000	2004	10	Y
WASHOUGAL	SWR 1	10,000	2004	10	Y
WOODLAND	SWR 1	4,000	2004	10	Y
WOODLAND	SWR 1	4,000	2004	10	Y
WOODLAND	SWR 1	4,000	2004	10	Y
WOODLAND	SWR 1	4,000	2004	10	Y
KELSO	SWR 1	4,000	2006	8	Y
KELSO	SWR 1	4,000	2006	8	Y
KELSO	SWR 1	4,000	2006	8	Y
KELSO	SWR 1	4,000	2006	8	Y

MT ST HELENS	SWR 1	4,000	2006	8	Y
MT ST HELENS	SWR 1	4,000	2006	8	Y
MT ST HELENS	SWR 1	4,000	2006	8	Y
VANCOUVER	SWR 1	10,000	2006	8	Y
FARGHER LAKE	SWR 1	3,000	2006	8	N
PACKWOOD	SWR 2	2,500	1997	17	Y
PACKWOOD	SWR 2	2,500	1997	17	Y
PACKWOOD	SWR 2	2,500	1997	17	Y
PACKWOOD	SWR 2	2,500	1997	17	Y
TOLEDO	SWR 2	6,000	1997	17	Y
TOLEDO	SWR 2	6,000	1997	17	Y
TOLEDO	SWR 2	6,000	1997	17	Y
TOLEDO	SWR 2	6,000	1997	17	Y
MORTON	SWR 2	10,000	2002	12	Y
MORTON	SWR 2	2,800	2002	12	Y
MORTON	SWR 2	2,800	2002	12	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
CHEHALIS	SWR 2	10,000	2006	8	Y
NASELLE	SWR 3	2,600	1999	15	Y
NASELLE	SWR 3	2,600	1999	15	Y
NASELLE	SWR 3	2,600	1999	15	Y
RAYMOND	SWR 3	2,500	1999	15	Y
RAYMOND	SWR 3	2,500	1999	15	Y

CATHLAMET	SWR 3	2,500	1999	15	N
CATHLAMET	SWR 3	2,500	1999	15	N
CATHLAMET	SWR 3	2,500	1999	15	N
McCORMICK	SWR 3	5,000	2000	14	Y
McCORMICK	SWR 3	5,000	2000	14	Y
RAYMOND	SWR 3	10,000	2000	14	Y
NASELLE	SWR 3	10,000	2007	7	Y
GOLDENDALE	SWR 4	10,000	2000	14	Y
STEVENSON	SWR 4	5,000	2000	14	Y
STEVENSON	SWR 4	5,000	2000	14	Y
SATUS PASS	SWR 4	2,000	2000	14	N
BINGEN	SWR 4	10,000	2004	10	Y
BINGEN	SWR 4	6,000	2004	10	Y
GOLDENDALE	SWR 4	10,000	2004	10	Y
MARY HILL	SWR 4	2,000	2006	8	N