DEPARTMENT OF ECOLOGY
State of Washington

Sinclair and Dyes Inlets Fecal Coliform TMDL

Local Review Meeting

February 17, 2011

Objectives of today's meeting

- TMDL nuts & bolts --
  - How water quality data are used to establish responsibilities
- Highlight Water Quality data – recent vs. WY2003
- What are permittees required to do?
- How will non-point sources be addressed?
- Walk-through draft Sinclair Dyes TMDL
- Comments due March 31st

Getting to TMDL

This TMDL Address 42 303d listings:
35 Streams
7 Marine

Water body on List of Impaired Waters

ENVVEST Coordinated Monitoring/Modeling

Monitoring and Modeling

Develop TMDL

We are Here

Assign Responsibility

Public Review of Draft

EPA Approval

Early Actions have already been implemented

Implementation

Ecology works with local organizations, Tribes & government agencies

Ecology De-listing

Ecology's Role – ENVVEST Partnership with EPA, U.S. Navy

- State responsibility to protect water quality (federal Clean Water Act)
- Review Navy design for water quality study
- Study complies with state TMDL requirements
- TMDL Implementation Plan to get the water clean/EPA review
- TMDL public process

Purpose, structure of TMDLs

- Use scientific approach to determine loads of pollutant to watershed
- Determine how much these loads need to be reduced (% reductions) to meet water quality standards
- Assign responsibility through NPDES permits
- Assign responsibility for cleanup of nonpoint sources

Jurisdictions Responsible for Implementing TMDL

- Kitsap County
- City of Bremerton
- City of Port Orchard
- City of Bainbridge Island
- Wash. DOT
- US Navy
- Sewer Districts
- Conservation Districts
- Port Districts

(and the people who live, work, and visit here)

Water Quality Standards for Bacteria

Marine **14** cfu/100 mL sample (geomean)

43 cfu/100 mL (90th percentile)

Freshwaters draining to Dyes Inlet, Port Orchard Passage and western Sinclair Inlet –

100 cfu/100 mL (geomean);

200 cfu/100 mL (90th percentile)

Eastern Sinclair Inlet and Rich Passage

50 cfu/100 mL (geomean);

100 cfu/100 mL (90th percentile)

Results – Marine waters

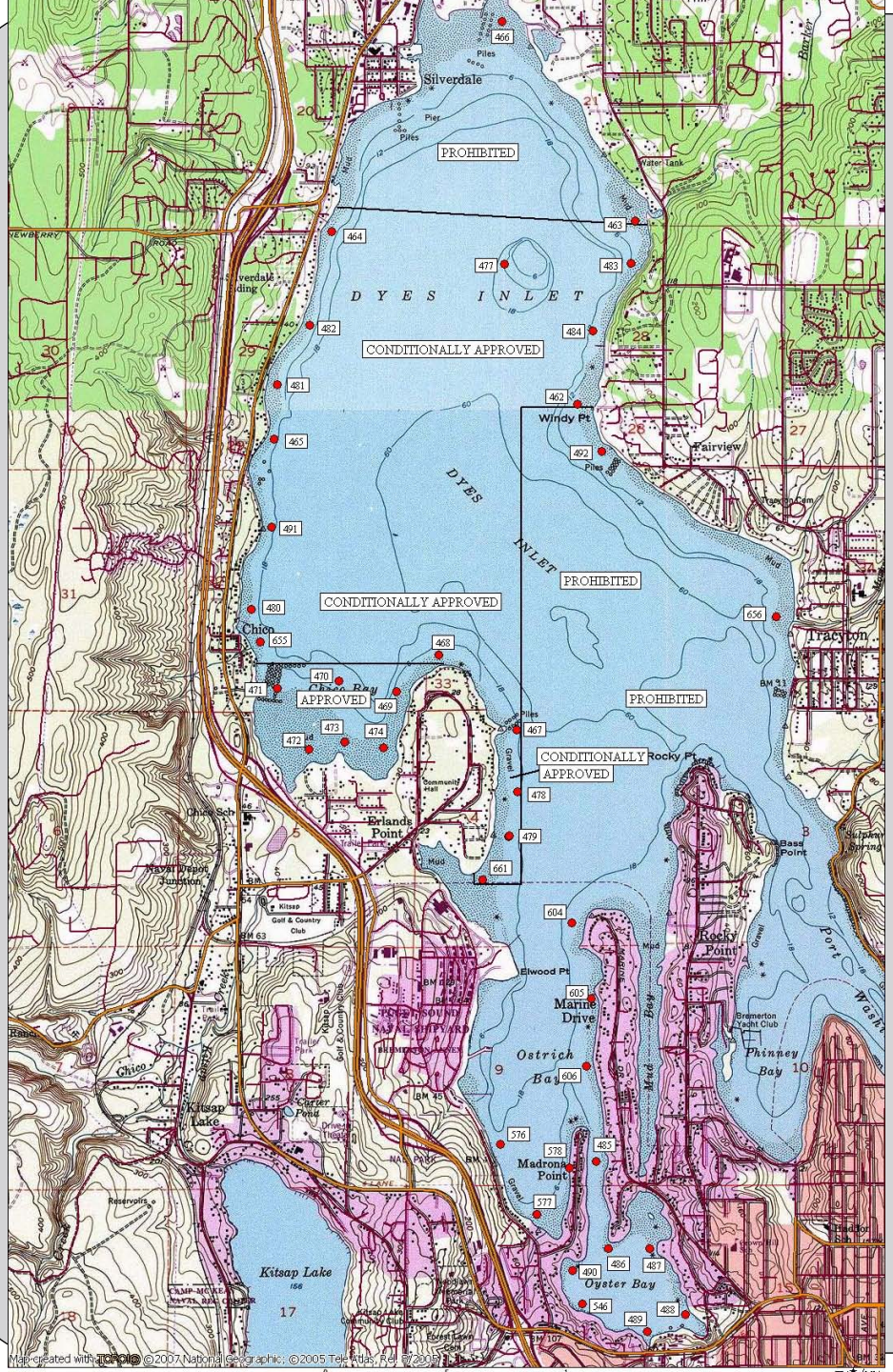
Model-predicted exceedances for WY2003

- "Actual conditions" model run
  - Nearshore areas below Clear & Gorst creeks
- 100/200 model run
  - Nearshore areas below Gorst & Blackjack creeks and near Bremerton WWTP outfall
- 200/400 model run
  - Nearshore areas below Clear, Gorst, Blackjack and near Bremerton WWTP outfall

- WY2003 monitoring data – nearshore & marine waters

“Observed data” – WY 2003 exceedances in nearshore areas

- Below Clear Creek
- Port Washington Narrows
  - Anderson Cove and Pine Rd outfall/E Bremerton
- Rich Passage nearshore
  - Lynwood Center
  - Fort Ward State Park
- Sinclair Inlet nearshore
  - Below Blackjack Creek
  - Below Karcher Creek



Updating the TMDL

Many years worth of local implementation and water quality progress:

- City of Bremerton CSO reductions
- Kitsap County Health District Pollution Identification & Correction projects
- Phased Implementation of Phase II NPDES municipal stormwater permit
- City of Bremerton connects Gorst neighborhood to sewer

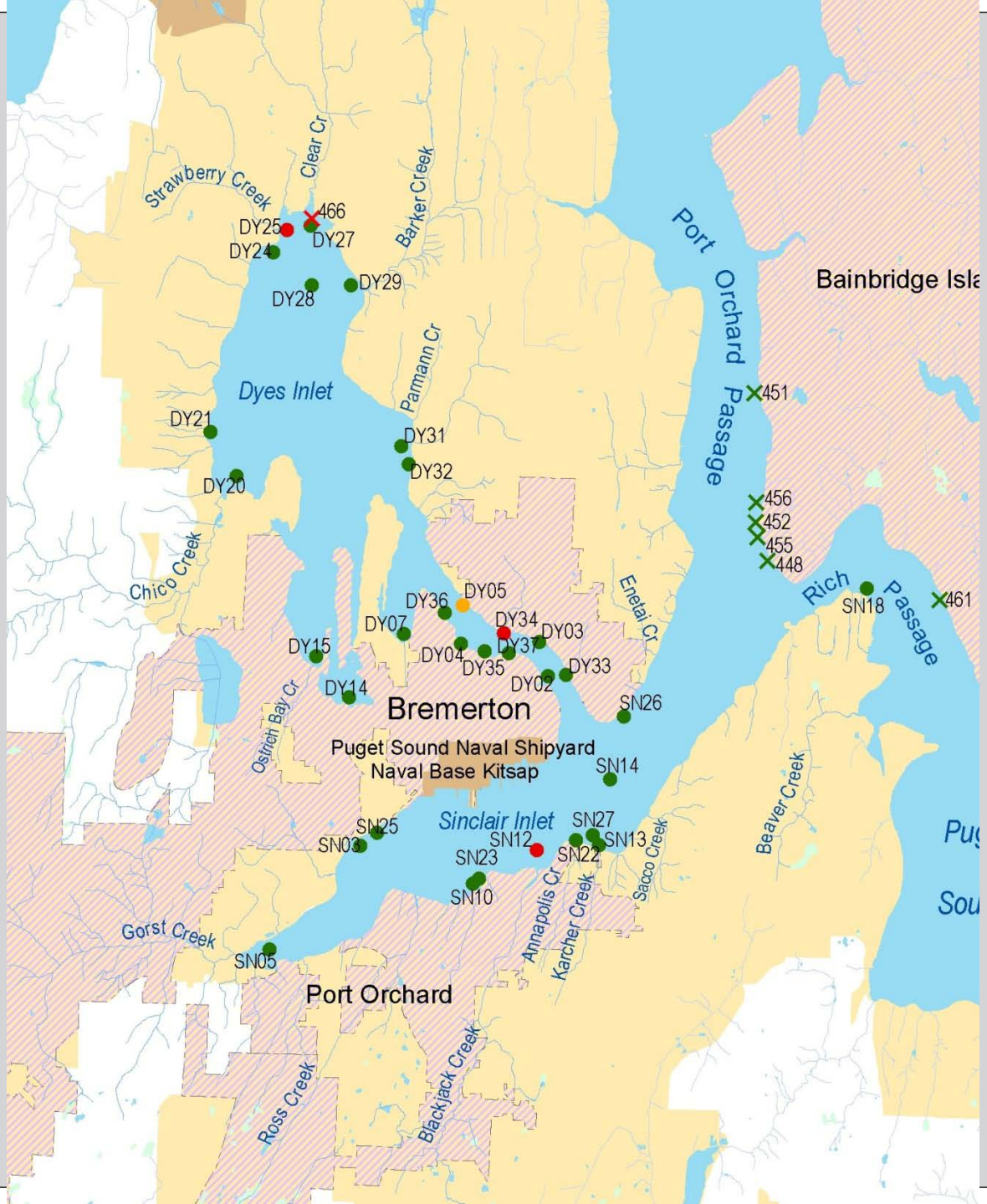
Loading Capacity

- Marine waters – must meet 14 cfu/100 ml and 43 cfu/100 mL
- Streams – must meet 100 cfu/100 mL and 200 cfu/100mL (or 50 cfu/100 mL and 100 cfu/100 mL)

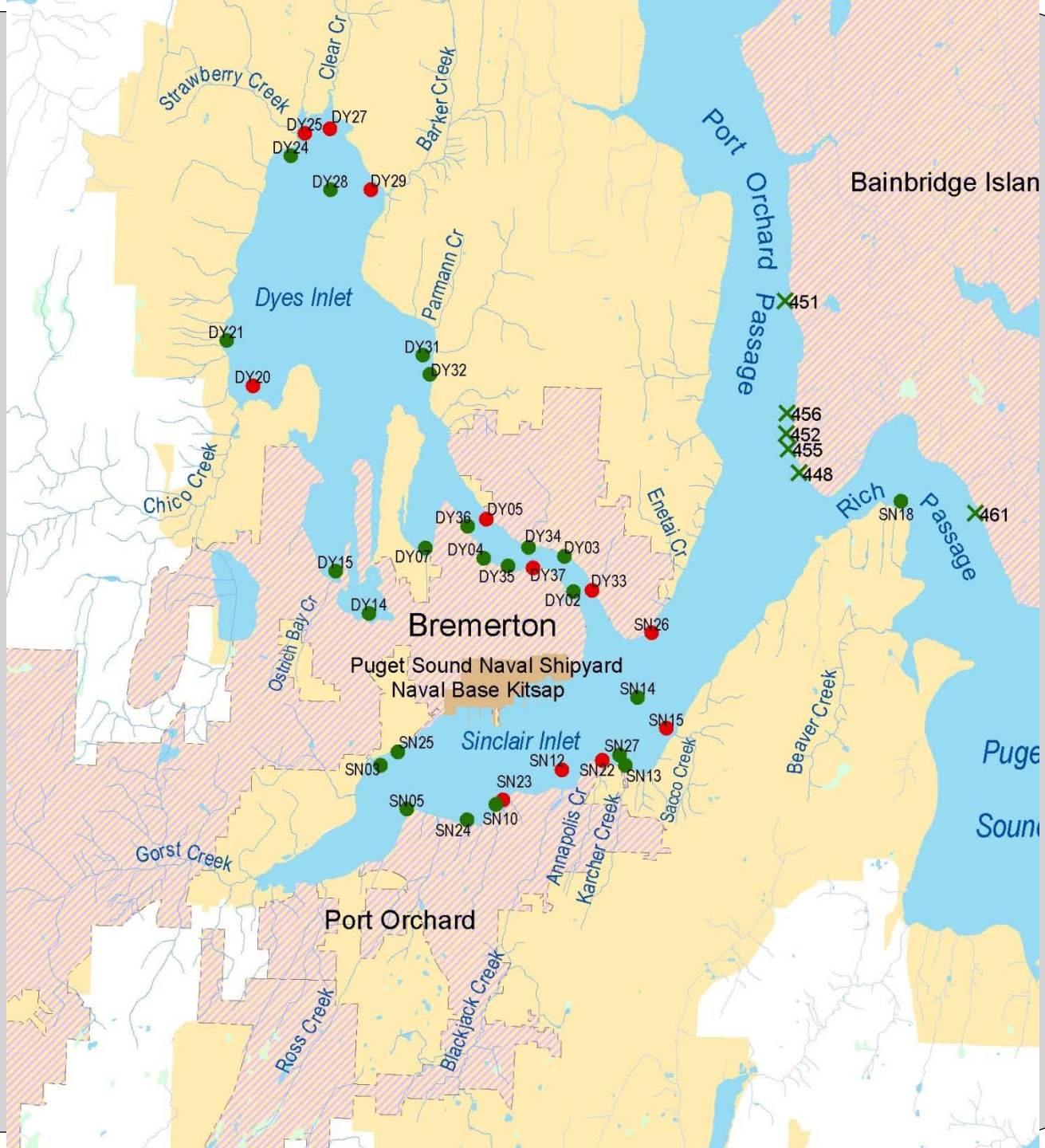
STRICTER TARGET REQUIRED FOR:

- Gorst Creek at mouth 25 cfu/100 mL and 50 cfu/100 mL
- Clear Creek at mouth 73 cfu/100 mL and 146 cfu/100 mL
- Blackjack Cr at mouth 62 cfu/100 mL and 125 cfu/100 mL

WY2009 – DOH & KCHD data



WY2010 – DOH & KCHD data



Recent marine WQ data – Table 22

Site No.	Kitsap Health Monitoring Site Location Description	WY2003		WY2009		WY2010		LA/WLA?
		Observed exceed-ances[1]	Modeled exceed-ances[2]	GM	90th	GM	90th	
DY27	HEAD OF DYES NEAR CLEAR CREEK ESTUARY	yes	yes	3	8	23	818	yes
DY25	NRSHORE STRAWBERRY CRK MOUTH			3	45	12	281	yes
DY04	NEARSHORE ANDERSON COVE - PORT WA MARINA CSO-OF9	yes		2	4	3	14	Monitoring
	Rich Passage – Lynwood Ctr	yes						Monitoring
	Rich Passage – Fort Ward	yes						Monitoring
	Nearshore at PSNS & IMF							Monitoring
SN03	NEARSHORE HWY 3 MERGER NR PILINGS (BREM WWTP OUTFALL)		yes	1	4	2	4	Monitoring
SN05	Gorst estuary, head of Sinclair Inlet		yes	3	21	9	28	No (4B[3]) Monitoring
SN12	NEARSHORE BLACKJACK CR ESTUARY	yes	yes	6	101	10	77	yes
SN13	MOUTH OF KARCHER CREEK	yes		3	22	8	27	
DY37	City of Bremerton Chester Ave Storm water outfall			2	12	4	46	yes
DY34	NEARSHORE LENT LANDING, SW OF B-ST03 & CSO OF-2			5	154	12	33	yes
DY33	NEARSHORE OPPOSITE EVERGREEN Park B-SCHLEY CANYON			1	2	8	75	yes
DY29	NEARSHORE BARKER CREEK MOUTH			3	8	5	122	yes
DY20	CHICO BAY, MOUTH OF CHICO CRK			2	6	8	74	yes
DY05	NEARSHORE LIONS PARK SOUTH OF BOAT LAUNCH B-ST01			6	34	9	68	yes
SN26	OUTFALL AT BACHMANN PARK GAZEBO B-ST12 & CSO OF-7,7A			1	2	5	75	yes
SN23	NEARSHORE OUTFALL RT SIDE OF PO PUBLIC BOAT RAMP			2	4	11	76	yes
SN22	NEARSHORE MOUTH OF ANNAPOLIS CREEK			4	22	6	61	yes
SN15	NEARSHORE SACCO CR MOUTH					4	47	yes

Load Allocation & Wasteload Allocation

WY2010 - nearshore below Blackjack Creek

- 10 cfu/100 mL (geometric mean)
- 77 cfu/100 mL (90th percentile)

Percent reduction = 44% (for 90th percentile to meet 43)

44% reduction is assigned to both point sources and nonpoint sources if there are no data to distinguish

44% = Wasteload Allocation for piped stormwater from Port Orchard's MS4.

As part of IDDE, Port Orchard will coordinate with WSDOT for stormwater discharges from SR 166 and SR 16

Kitsap County assigned freshwater WLA = 25% (Blackjack Cr above SR16)

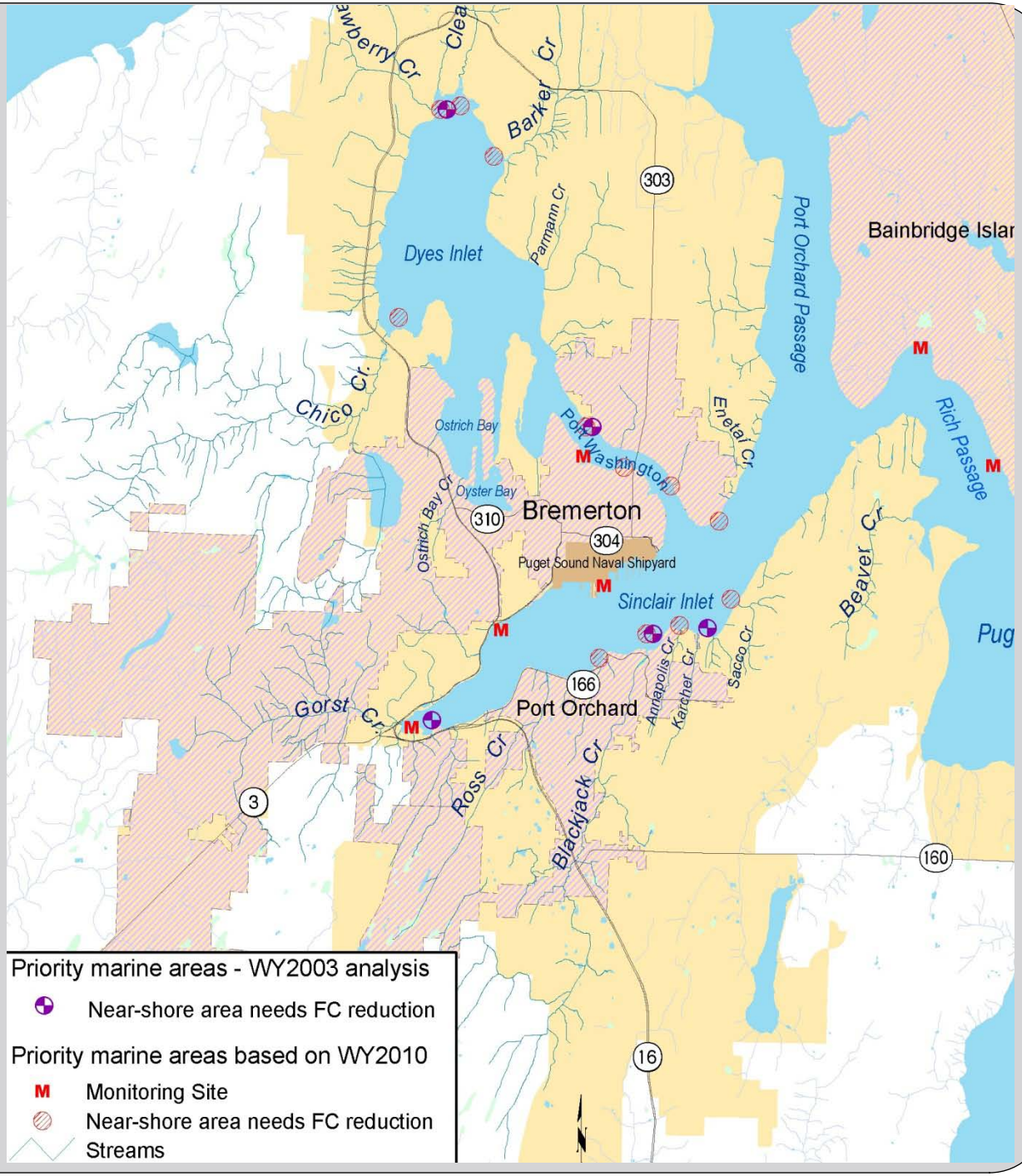
EPA guidance for setting WLAs for stormwater sources with NPDES permits

- NPDES permits must contain effluent limits and conditions consistent with the TMDL
- Narrative effluent limits may be used in lieu of numeric water quality-based limits.
- Narrative limits can be expressed in the form of Best Management Practices (BMPs).

Table 23 – Marine WLAs

Water Body	Site no./description	LA/WLA (% FC reduction required)	NPDES Stormwater Permittees					
			City of Bainbridge Isl.	City of Bremerton	City of Port Orchard	Kitsap County	Navy	WSDOT
Dyes Inlet nearshore	DY29 below Barker Creek	65%				Barker Cr		SR303
	DY25 below Strawberry Crk	85%			Strawberry Cr			SR3, SR303
	DY27 below Clear Crk	95%				Clear Cr	Clear Cr	SR3, SR303
	DY20 Chico Bay	42%				Chico Bay/Erlands Pt		SR3
Port Washington Narrows	DY05 below Lions Park	37%		E. Bremerton, Pine Rd., Cherry Ave.				SR303
	DY33 opp. Evergreen Park	43%		W. Bremerton				SR303
	DY37 Chester Ave stormwater outfall	7%		W. Bremerton				SR303
Rich Passage	Lynwood Center	*Monitoring*	Lynwood Ctr, Schel-Chelb Cr					
	Fort Ward	*Monitoring*	Fort Ward					
Sinclair Inlet nearshore	SN26 Bachmann Prk outfall	43%		Trenton Ave.				
	SN03 Bremerton WWTP Outfall	*Monitoring*		Loxie Eagens	National Ave			SR3, SR304
	SN05 Gorst	*48 Monitoring*		Gorst Creek, Anderson Cr		Gorst		SR3, SR16
	SN23 PO public boat ramp	43%			Bay St., PO Boulevard			SR166
	SN22 below Annapolis Crk	30%			Annapolis Cr	Annapolis Cr		
	SN15 below Sacco Crk	9%				Sacco Creek		
	SN12 below Blackjack Crk	44%			Westbay Ctr	Blackjack Cr		SR166
	Receiving waters below PSNS & IMF/NBK outfalls	*Monitoring*		Callow Ave Pacific Ave			Shipyard	SR304

Revised Figure 24 (handout) Marine areas needing % reductions



Recent freshwater data- Kitsap Health ambient monitoring program for WY 2010

Recent freshwater WQ data

- Calculate how much of the % reduction needed in WY2003 data has been accomplished
- Calculate the current % reduction needed based on WY2009 and WY2010 data
- Example – Parman Creek
  - WY2003 Dry Season 86 geomean/553 90th %-tile
    - 64% reduction needed
  - WY2010 Dry Season 56 geomean/110 90th %-ile
    - Meets standard – 0% reduction needed

Color code - GREEN

Recent freshwater WQ data

- Calculate how much of the % reduction needed in WY2003 data has been accomplished
- Calculate the current % reduction needed based on WY2009 and WY2010 data
- Example – Parman Creek
  - WY2003 Wet Season 10 geomean/92 90th %-tile
    - No reduction needed
  - WY2010 Wet Season 48 geomean/490 90th %-ile
    - 59% reduction needed

Color code – RED (made no progress or got worse)

TMDL Table 25 compares WY 2003 and WY 2010

Stream/site	Target Concentration		Storm Events		2000-2003 Dry Season			2000-2003 Wet Season			WY 2010 Dry Season		WY 2010 Wet Season		Current Status: %Reduction Required to Achieve Limiting Target	
	Geomean cfu/100 ml	90th %ile cfu/100 ml	Geomean cfu/100 ml	90th %ile cfu/100 ml	Geomean cfu/100 ml	90th %ile cfu/100 ml	Reduction Needed	Geomean cfu/100 ml	90th %ile cfu/100 ml	Reduction Needed	Geomean cfu/100 ml	90th %ile cfu/100 ml	Geomean cfu/100 ml	90th %ile cfu/100 ml	Dry	Wet
Dyes Inlet tributaries																
Parman PA01	100	200	Not sampled		86	**553**	64%	10	92	None	56	110	48	490	OK	59%
Barker BK01	100	200	109	422	138	**450**	56%	53	**352**	43%	141	302	24	658	34%	70%
Clear CC01	73 [a]	146 [a]	Not sampled		255	**1411**	90%	50	**388**	62%	44	92	42	264	OK	45%
Strawberry SR01	73 [a]	146 [a]	140	839	139	**630**	77%	33	**178**	18%	45	142	49	940	OK	84%
Chico CH01	100	200	Not sampled		41	141	None	8	61	None	21	50	22	168	OK	OK
Ostrich Bay OB01	100	200	Not sampled		582	**2954**	93%	140	**1568**	87%	639	6044	135	1180	97%	83%
Phinney PH01	100	200	Not sampled		Not sampled			Not sampled			818	1752	422	1601	89%	88%
Port Orchard Passage tributary																
Enetai DE01	100	200	423	3236	403	**1585**	87%	231	**1421**	86%	165	334	80	826	40%	76%
Rich Passage/Clam Bay tributary																
Beaver BV01	50 [b]	100 [b]	87	379	190	**669**	85%	79	**462**	78%	94	202	13	62	50%	OK
Sinclair Inlet tributaries																
Gorst at mouth	24 [a]	47 [a]	79	410	110	**495**	91%	45	**247**	81%	72	150	15	138	69%	66%
Gorst at Jarstad	100	200	107	351	83	**369**	46%	40	**346**	42%	Not sampled		Not sampled			
Ross RS02	100	200	Not sampled		91	**550**	64%	15	137	None	20	62	6	122	OK	OK
Blackjack at mouth	62 [a]	125 [a]	78	495	123	**400**	69%	39	**138**	9%	42	94	17	218	OK	43%
Blackjack SR16	100	200	114	524	76	**252**	21%	26	141	None	44	86	30	266	OK	25%
Annapolis AP02	100	200	263	1551	317	**953**	79%	216	**1391**	86%	151	240	61	814	34%	75%
Karcher KA01	50 [b]	100 [b]	365	2847	232	**705**	86%	125	**958**	90%	248	302	120	1462	80%	93%
Sacco SC04	50 [b]	100 [b]	109	544	200	**845**	88%	107	**877**	89%	127	1253	59	552	92%	82%

[a] Target reduced to meet marine standard in nearshore

[b] Extraordinary standard applies

Bold indicates which statistic (of geomean or 90th percentile) needs the larger percent reduction in FC.

Percent of Improvement	
	<= 0%
	> 0 <=25%
	>25<=50%
	>50%
OK	Meets Standard

Load Allocation & Wasteload Allocation

WY2010 – Parman Creek Dry Season

- 56 (geomean)/110 (90th percentile)

No reduction needed

WY2010 – Parman Creek Wet Season

- 48 (geomean)/490 (90th percentile)

Percent reduction needed = 59% (for 90th percentile to meet 200)

59% reduction -- assigned to both point sources and nonpoint sources if there are no data to distinguish

59% is the Wasteload Allocation for any piped stormwater from Kitsap County's MS4.

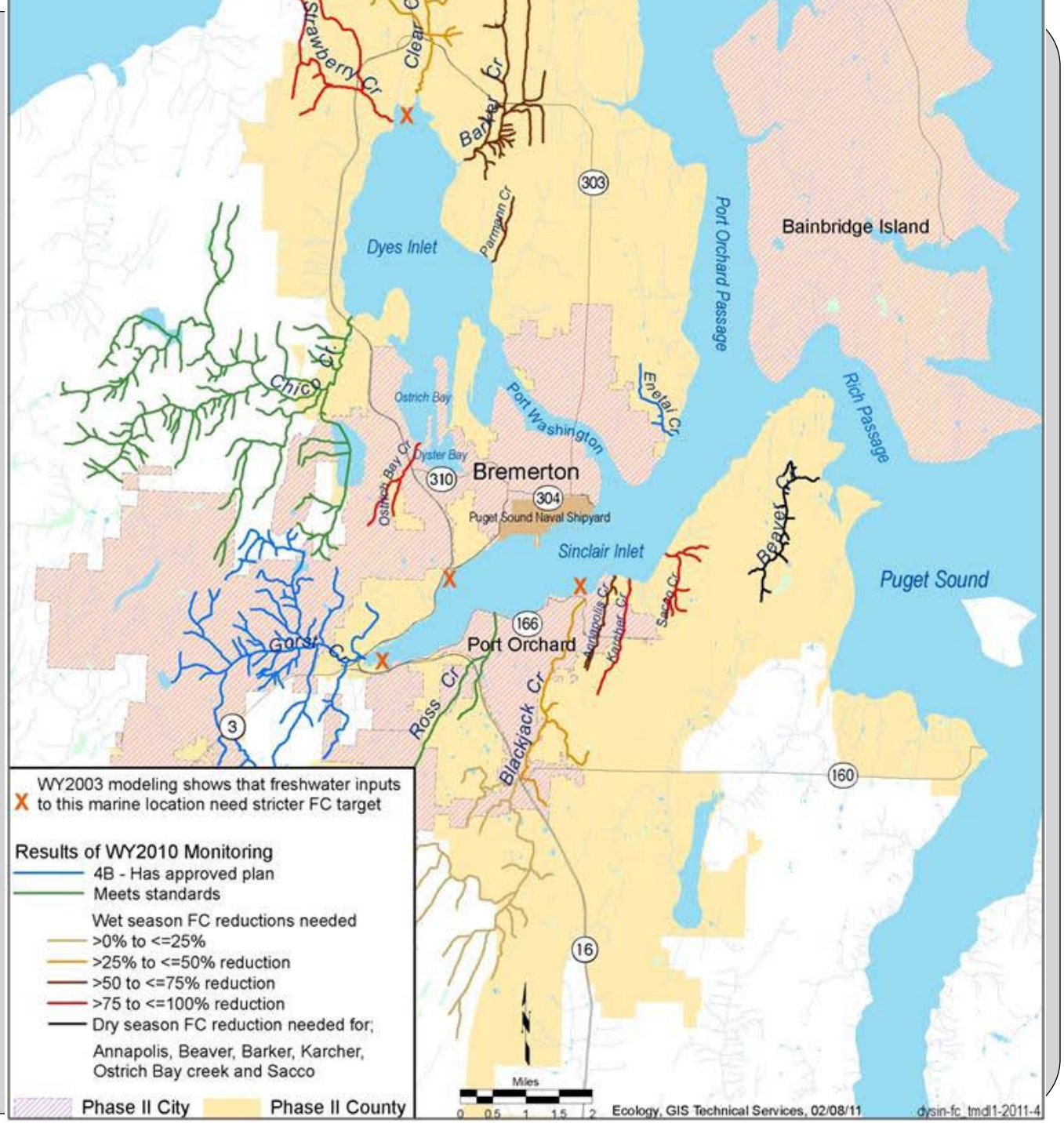
Table 26 – Freshwater LAs & WLAs

Water Body	Stream/site	LA/WLA (% FC reduction required)		NPDES Stormwater Permittees				
		Dry Season	Wet Season	City of Bremerton	City of Port Orchard	Kitsap County	Navy	WSDOT
Dyes Inlet tributaries	Parman PA01	none	59%					SR304
	Barker BK01	34%	70%					SR304
	Clear CC01[a]	none	45%				x	SR3, SR304
	Strawberry SR01[a]	none	84%					SR3, SR304
	Ostrich Bay OB01	97%	83%			x		SR3
	Phinney PH01	89%	88%	x				SR310?
	All other tributaries	*Must meet 100/200 criteria*		*If permittee discharges stormwater to waterbody*				
Port Orchard Passage	Enetai Creek	*Category 4B*						
Rich Passage /Clam Bay	Beaver BV01[b]	50%	none					
Sinclair Inlet Tributaries	Gorst Creek	*Category 4B*						
	Blackjack at mouth[a]	none	43%			x		SR16, SR166
	Blackjack at SR16	none	25%		x			SR16
	Annapolis AP02	34%	75%					
	Karcher KA01[b]	80%	93%			x		
	Sacco SC04[b]	92%	82%					
	All other tributaries	*Must meet 50/100 or 100/200 criteria*		*If permittee discharges stormwater to waterbody*				

[a]Target reduced to meet marine standard in nearshore

[b]Extraordinary standard applies

Figure 25 Stream % reductions needed



Bremerton WWTP – WLA decision

- ENVVEST model predicted exceedances of marine WQS
- Result contrasts with the mixing zone model approved by EPA and used as part of Ecology permit process
- ENVVEST model limitation required inputting WWTP discharge at surface, not at actual discharge depth
- Mixing, dilution, and dispersion occurs as plume rises from depth
- **"Watch list:"** TMDL requires continued monitoring at surface
- Ecology recently approved Bremerton WWTP request for re-rating to permit greater discharge during winter wet months

WWTP permittees

- WWTPs – Bremerton, Karcher/Port Orchard, Fort Ward
- Analysis does not support reduced permit limit for fecal coliform
- Other:
  - Develop GIS mapping of sewage collection lines
  - Assess integrity and frequency of repair of sewage collection system/any spills past 5 years

A WLA of 92% translates to….?

- WLA for stream/marine area with current FC impairment
  - Phase II municipalities (and other stormwater permittees) required to:
    - IDDE dry weather screening & follow-up for locations with WLAs
    - Optimize O & M in drainages to locations with WLAs
    - Review monitoring locations in Tables 29 and 30 – most of these are covered under current programs.

Table 28 – Implementation Summary

<u>Reducing FC from onsite septic systems</u>

- Kitsap Health – continue effective PIC programs
- Municipalities with stormwater permits – find and correct via Illicit Discharge Detection and Elimination
- Enterprise Cascadia – develop funds for sustainable loan program

Table 28 – Implementation Summary

<u>Recreational and liveaboard boater waste</u>

- Kitsap County Health District – marina pumpout survey & education – evaluate compliance
- KCHD – engage boating organizations in education

Table 28 – Implementation Summary

<u>Municipal and industrial stormwater (NPDES permittees including Navy)</u>

1. Address locations with WLAs using:
   a. Illicit Discharge Detection & Elimination
   b. Optimize frequency of O & M inspections of MS4 infrastructure
2. Ensure monitoring locations are covered

Table 28 – Implementation Summary

<u>WSDOT: implement municipal stormwater permit in Phase II coverage areas:</u>

- GIS mapping & review maintenance needs
- Dry weather screening
- Coordinate with locals on maintenance and IDDE

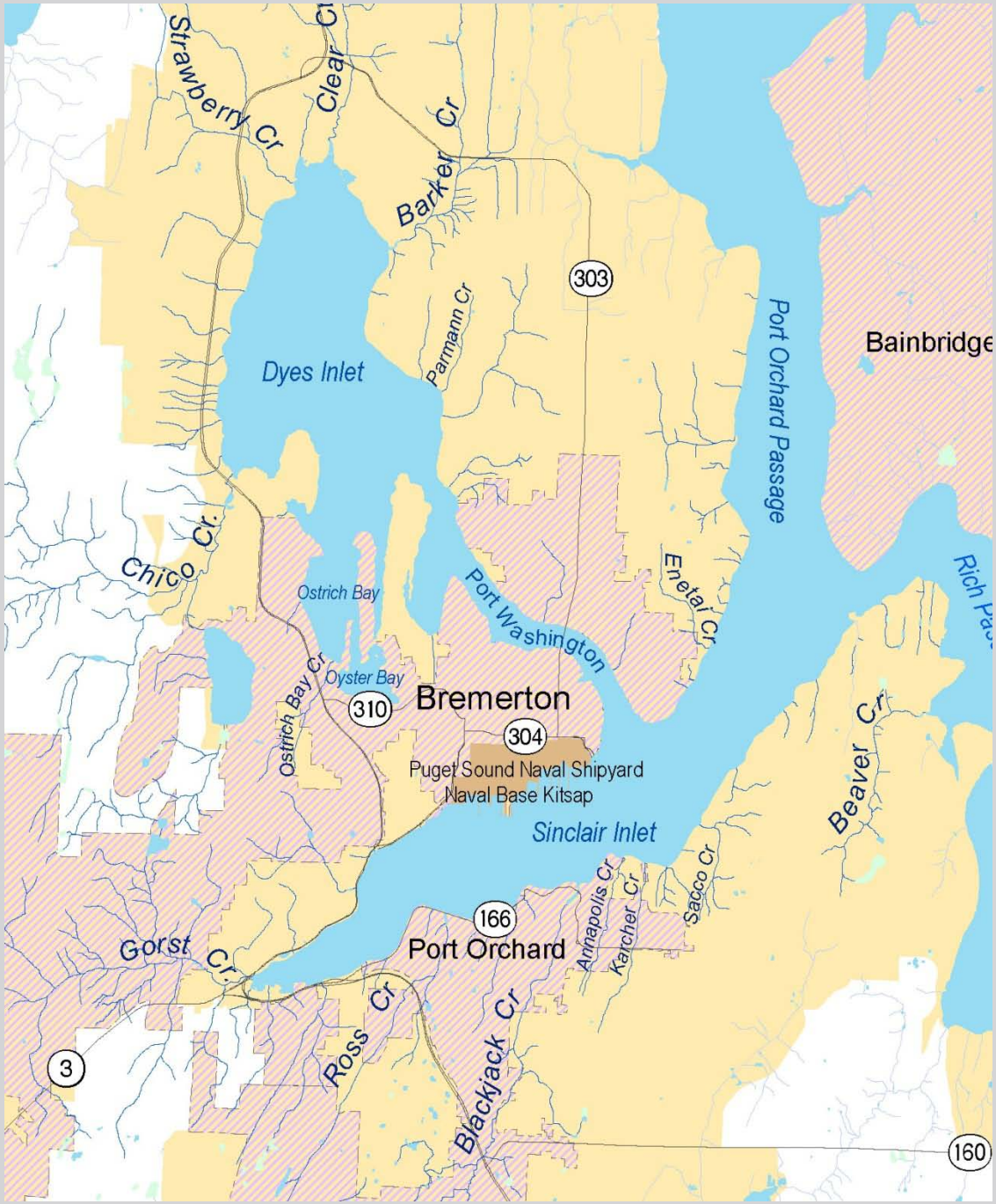


Table 28 – Implementation Summary

Municipal sewer districts & pipeline operators

- (all) Provide sewer collection line GIS locations to Phase II stormwater permittees
- Review record of repair for pumps and collection pipelines and assess potential for leakage to surface waters

Bremerton WWTP

- Work with KCHD to ensure monthly monitoring at SN03

Table 28 – Implementation Summary

Kitsap Conservation District recommendations:

- Continue livestock inventory – info to KCHD
- Continue to educate livestock owners regarding BMPs to protect surface water quality

Monitoring – Tables 29 and 30

- Stream monitoring – Kitsap Health has this role, but stormwater permittees have responsibility
- Nearshore monitoring – Kitsap Health and DOH
- Nearshore priority areas
  - Level I monitoring – assess compliance with water quality standards
  - Level II monitoring
    - If impairment confirmed, then investigate using IDDE approaches

TMDL section headings

- Margin of Safety – why we think this TMDL's approach is conservative
- Reasonable Assurance – why we don't need to be tougher on the point sources
- Implementation Plan – this is only 25 pages
- Measuring Progress toward Goals
- Adaptive Management

TMDL spare parts

Appendix F – Integrated model development and evaluation

(a mini-version of Bob’s Model Report)

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http://www.ecy.wa.gov/programs/wq/tmdl/sinclair-dyes_inlets/index.html

“Actual conditions” model run

- WY 2003 hydrology & discharge volumes
- Bacteria inputs at estimated geomean concentrations

Water body	Canary Node Location	Max(30-day moving Geomean of Daily Max FC)			**FC Reduction Needed (*Reduction*$_{P1}$)**
			cfu/ 100 mL		
		Grid cell	Surface	Depth-avg[b]	
Dyes	Nearshore below Clear Creek	AVG	16.5	16.5	**15.2%**
Sinclair	Nearshore below Gorst Creek	AVG	15.0	15.0	**4.0%**
Sinclair	Nearshore below Blackjack Cr	AVG	11.6	11.6	**Meets standard**

“100/200” model run

- WY2003 hydrological conditions and discharge volumes
- Streams, shoreline and stormwater input FC set at 100 cfu/100 mL and WWTP at 200 cfu/100 mL

Water body	Canary Node Location	Max(30-day moving Geomean of Daily Max FC)			**FC Reduction Needed (*Target_Reduction*)**
			cfu/ 100 mL		
		Grid cell	Surface	Depth-avg[b]	
Sinclair	Nearshore below Gorst Creek	AVG	49.1	49.1	**71.5%**
Sinclair	Nearshore below Blackjack Cr	AVG	22.4	22.4	**37.5%**
Sinclair	Nearshore Bremerton WWTP	AVG	19.1	11,7	**26.7%**

“200/400” model run

- WY2003 hydrologic conditions and discharge volumes
- Streams, shoreline runoff and stormwater inputs set to 200 cfu/100 mL; WWTPs set to 400 cfu/100 mL

Water body	Marine location	30-day moving 90th percentile of Daily Max FC			FC Reduction Needed
			cfu/100 mL		
		Grid cell	Surface	Depth-avg[b]	
Dyes	Nearshore below Clear Creek	AVG	58.9	58.9	**27.0%**
Sinclair	Nearshore below Gorst Creek	AVG	181.8	181.8	**76.3%**
Sinclair	Receiving waters for Bremerton WWTP treated discharge & stormwater	AVG	54.6	37.2	**21.2%**
Sinclair	Nearshore below Blackjack Creek	AVG	65.9	65.9	**34.7%**