Washington State Ferries Long Range Plan Preliminary Operational Service Scenarios

DRAFT May 2018

Route/Terminal		2017 on-time performance (Goal 95%)	Terminal holds 1 boat of vehicles? (Largest vessel)	Existing vehicle LOS (Percentage of daily sailings full)			Proposed passenger LOS (Passenger demand on peak sailing)			Planned near-term improvements	Potential strategies
				2017	2030	2040	2017	2030	2040		
Seattle/ Bremerton	Seattle		✓							Colman dock replacement	Traffic management; Transit connections; Vehicle reservations
	Bremerton	94.2%	✓				Tier 1	Tier 2	Tier 2		Vehicle reservations; Add passenger capacity
Seattle/ Bainbridge	Bainbridge	91.2%	✓			Approaches Tier 1	Tier 1	Tier 2	Tier 2		Vehicle reservations; Add passenger capacity
Fauntleroy/ Vashon/ Southworth	Fauntleroy	90.2%	✗	Tier 1	Tier 1	Tier 1				Fauntleroy dock replacement; Third Issaquah	• Transit connections • Parking at Vashon; Faster tolling at Fauntleroy
	Southworth		✓								
	Vashon		✗								
Pt. Defiance/ Tahlequah	Pt. Defiance	98.9%	✗								Transit connections
	Tahlequah		✗								
Edmonds/ Kingston	Edmonds	95.3%	✗		Tier 1	Tier 1					• Address RR conflict in Edmonds • Queue management in Kingston; Transit connections; Vehicle reservations; Three mid-size vessels
	Kingston		✓								
Mukilteo/ Clinton	Mukilteo	95.9%	✓	Tier 1	Tier 1	Tier 1				Clinton overhead loading; New Mukilteo terminal; Second Olympic Class	• Transit connections • Parking capacity; Vehicle reservations
	Clinton		✓								
Port Townsend/ Coupeville	Port Townsend	92.0%	✓	Tier 1	Tier 2	Tier 2					Off-peak incentives for commercial; • Spread two boat service to early spring and late fall • Restore early morning/ late afternoon sailings in summer; Add vehicle capacity
	Coupeville		✓								
Anacortes/ San Juan Islands	Anacortes	83.8%	✓	Tier 1	Tier 1	Tier 1					Overhead loading at Friday Harbor; • Transit connections on islands • Parking pricing strategy • Transit at Anacortes; Expand reservations to Shaw and Lopez (EB) (Expand holding lanes); • Restore winter service hours • Expand summer schedule to spring and fall
	Lopez		✗								
	Shaw		✗								
	Orcas		✓								
	San Juan		✗								
Anacortes/ San Juan Islands/ Sidney, B.C.	Sidney	86.5%	✓								Transit connections in Sidney; Customs processing at Sidney

Tier 1 Level of Service: 25-50%; 50-75%; 70-85%; 85-100%

Tier 2 Level of Service

Traffic/terminal operations management

Promote mode shift

Technology improvements

Increase vessel capacity

Schedule change

Washington State Ferries Long Range Plan—Preliminary Vessel Retirement and Replacement Timelines—FOR DISCUSSION

DRAFT May 2018

MODIFIED PROGRAM

	CLASS	VESSEL	2018 ROUTE	1 2019	2 2020	3 2021	4 2022	5 2023	6 2024	7 2025	8 2026	9 2027	10 2028	11 2029	12 2030	13 2031	14 2032	15 2033	16 2034	17 2035	18 2036	19 2037	20 2038	21 2039	22 2040
L	Jumbo Mark II	Tacoma (1997)	Seattle/Bainbridge			All-Electric/Hybrid Conversion																		
		Wenatchee (1998)	Seattle/Bainbridge				All-Electric/Hybrid Conversion																	
		Puyallup (1999)	Edmonds/Kingston					All-Electric/Hybrid Conversion																
	Jumbo	Spokane (1972)	Edmonds/Kingston															60* SPOKANE Replacement						
		Walla Walla (1973)	Seattle/Bremerton																60* WALLA WALLA Replacement					
M	Super	Hyak (1967)	Emergency	52*																				
		Elwha (1967)	San Juan (SOLAS)							58* ELWHA (SOLAS) Replacement														
		Kaleetan (1967)	Seattle/Bremerton & Maintenance								60* KALEETAN Replacement													
		Yakima (1967)	San Juan									61* YAKIMA Replacement												
	Olympic	Tokitae (2014)	Mukilteo/Clinton																					
		Samish (2015)	San Juan																					
		Chimacum (2017)	Seattle/Bremerton																					
		Suquamish (2018)	Mukilteo/Clinton & Maintenance																					
	Issaquah	Issaquah (1979)	Fauntleroy/Vashon										50* ISSAQUAH Replacement											
		Kitsap (1980)	Fauntleroy/Vashon										50* KITSAP Replacement											
		Kittitas (1980)	Mukilteo/Clinton											51* KITTITAS Replacement										
		Cathlamet (1981)	Fauntleroy/Vashon												52* CATHLAMET Replacement									
		Chelan (1981)	San Juan (SOLAS)													54* CHELAN Replacement								
		Sealth (1982)	San Juan														54* SEALTH Replacement							
	New	New (2036)																		New Vessel				
		New (2037)																			New Vessel			
		New (2038)																				New Vessel		
S	Evergreen State	Tillikum (1959)	Emergency	62*																				
	Kwa-di-Tabil	Chetzemoka (2010)	Pt Defiance/Tahlequah													All-Electric/Hybrid Conversion to Azimuth Propulsion								
		Salish (2011)	Port Townsend/Coupeville														All-Electric/Hybrid Conversion to Azimuth Propulsion							
		Kennewick (2011)	Port Townsend/Coupeville															All-Electric/Hybrid Conversion to Azimuth Propulsion						

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Fleet Size		23	22	22	21	21	21	22	22	23	23	23	23	23	23	23	23	23	23	23	24	24	24
Vessels in Risk		3	2	2	1	3	3	4	5	7	8	8	7	6	5	4	2	2	1	0	0	0	0
Vessels in Service	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Maintenance Relief	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
Service Relief	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Fleet size goal for current service levels.

Diesel Vessel in Service
Propulsion Conversion
New Hybrid/Electric
New Diesel/Hybrid Ready
Reliablity Risk
✱ Age at Retirement

NOTES:
1. The higher demand summer season is shown with 19 vessels in service.
2. JMII conversions are assumed to occur in the fall/winter/spring leaving the vessel available for summer service.
3. Issaquah Class life expectancy shortened to +/- 50 years.
4. Reliability risk zone shown at year 45 for Issaquah Class and 55 for Jumbo Class.
5. The retirement dates of vessels are extended to maintain 23/2/2 (23 vessel fleet with 2 in maintenance relief and 2 in service relief as a minimum).
6. Assumes a Washington shipyard for new construction vessels delivered at one-year intervals.
7. Beginning year for new construction (2024) +7 years from 2018 to represent existing understanding of Design and RFP timeframe.
8. Where risk zone and green (new vessel) overlap, vessel retained to maintain 23/2/2.

Washington State Ferries Long Range Plan—Preliminary Vessel Retirement and Replacement Timelines—FOR DISCUSSION

DRAFT

May 2018

MODIFIED PLUS PROGRAM

	CLASS	VESSEL	2018 ROUTE	1 2019	2 2020	3 2021	4 2022	5 2023	6 2024	7 2025	8 2026	9 2027	10 2028	11 2029	12 2030	13 2031	14 2032	15 2033	16 2034	17 2035	18 2036	19 2037	20 2038	21 2039	22 2040
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	Olympic	Tokitae (2014)	Mukilteo/Clinton																						
		Samish (2015)	San Juan																						
		Chimacum (2017)	Seattle/Bremerton																						
		Suquamish (2018)	Mukilteo/Clinton & Maintenance																						
		New (2023)	(SOLAS)					New Hybrid Vessel																	
		New (2024)	(SOLAS)						New Hybrid Vessel																
	Issaquah	Issaquah (1979)	Fauntleroy/Vashon										49* ISSAQUAH Replacement												
		Kitsap (1980)	Fauntleroy/Vashon										49* KITSAP Replacement												
		Kittitas (1980)	Mukilteo/Clinton										50* KITTITAS Replacement												
		Cathlamet (1981)	Fauntleroy/Vashon										51* CATHLAMET Replacement												
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	New	New (2036)																			New Vessel				
S	Evergreen State	Tillikum (1959)	Emergency	62*																					
	Kwa-di-Tabil	Chetzemoka (2010)	Pt Defiance/Tahlequah												All-Electric/Hybrid Conversion to Azimuth Propulsion										
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Vessels in Risk		3	2	2	1	3	3	4	5	7	8	8	7	6	5	4	2	2	1	0	0	0	0
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Maintenance Relief	2	2	2	2	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Service Relief	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Fleet size goal for current service levels.

- Diesel Vessel in Service
- Propulsion Conversion
- New Hybrid/Electric
- New Diesel/Hybrid Ready
- Reliablity Risk
- * Age at Retirement

NOTES:

1. The higher demand summer season is shown with 19 vessels in service.
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8. Where risk zone and green (new vessel) overlap, vessel retained to maintain 23/2/2.

Washington State Ferries Long Range Plan—Preliminary Vessel Retirement and Replacement Timelines—FOR DISCUSSION

DRAFT May 2018

CURRENT PROGRAM

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Vessels in Service	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Maintenance Relief	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Service Relief	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MIN.																						

All-Electric/Hybrid Conversion

All-Electric/Hybrid Conversion

All-Electric/Hybrid Conversion

60* SPOKANE Replacement

60* WALLA WALLA Replacement

52*

57* ELWHA (SOLAS) Replacement

60* KALEETAN Replacement

60* YAKIMA Replacement

60*

60*

60*

60* (2041)

60* (2041)

60* (2042)

62*

All-Electric/Hybrid Conversion to Azimuth Propulsion

All-Electric/Hybrid Conversion to Azimuth Propulsion

All-Electric/Hybrid Conversion to Azimuth Propulsion

Diesel Vessel in Service
Propulsion Conversion
New Hybrid/Electric
New Diesel/Hybrid Ready
Reliablity Risk
* Age at Retirement

NOTES:
1. The higher demand summer season is shown with 19 vessels in service.
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4. Beginning year for new construction (2024) +7 years from 2018 to represent existing understanding of Design and RFP timeframe.
5. Reliability risk zone shown at year 45 for Issaquah Class and 55 for Jumbo Class.

Washington State Ferries 2040 Long Range Plan

Technical and Policy Advisory Group

Stephanie Cirkovich, WSF Community Services and Planning Director
Ray Deardorf, WSF Senior Planning Manager
Hadley Rodero, Strategic Communications Manager

May 17, 2018

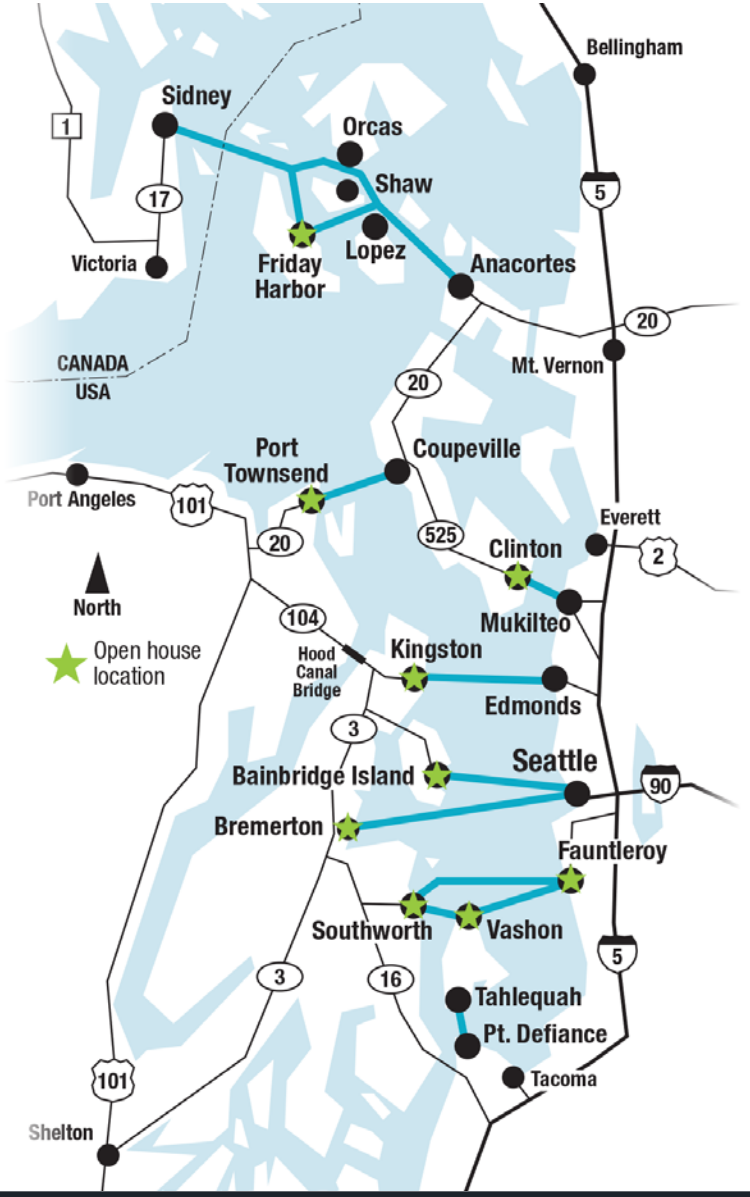
Agenda

- Welcome and introductions
- Community engagement update
- Present key plan elements
- Lunch break
- Update on work to date for additional plan elements
- Small group discussions
  - Route-by-route service scenarios
  - Vessel maintenance and replacement
- Small group report out
- Next steps

Community engagement update

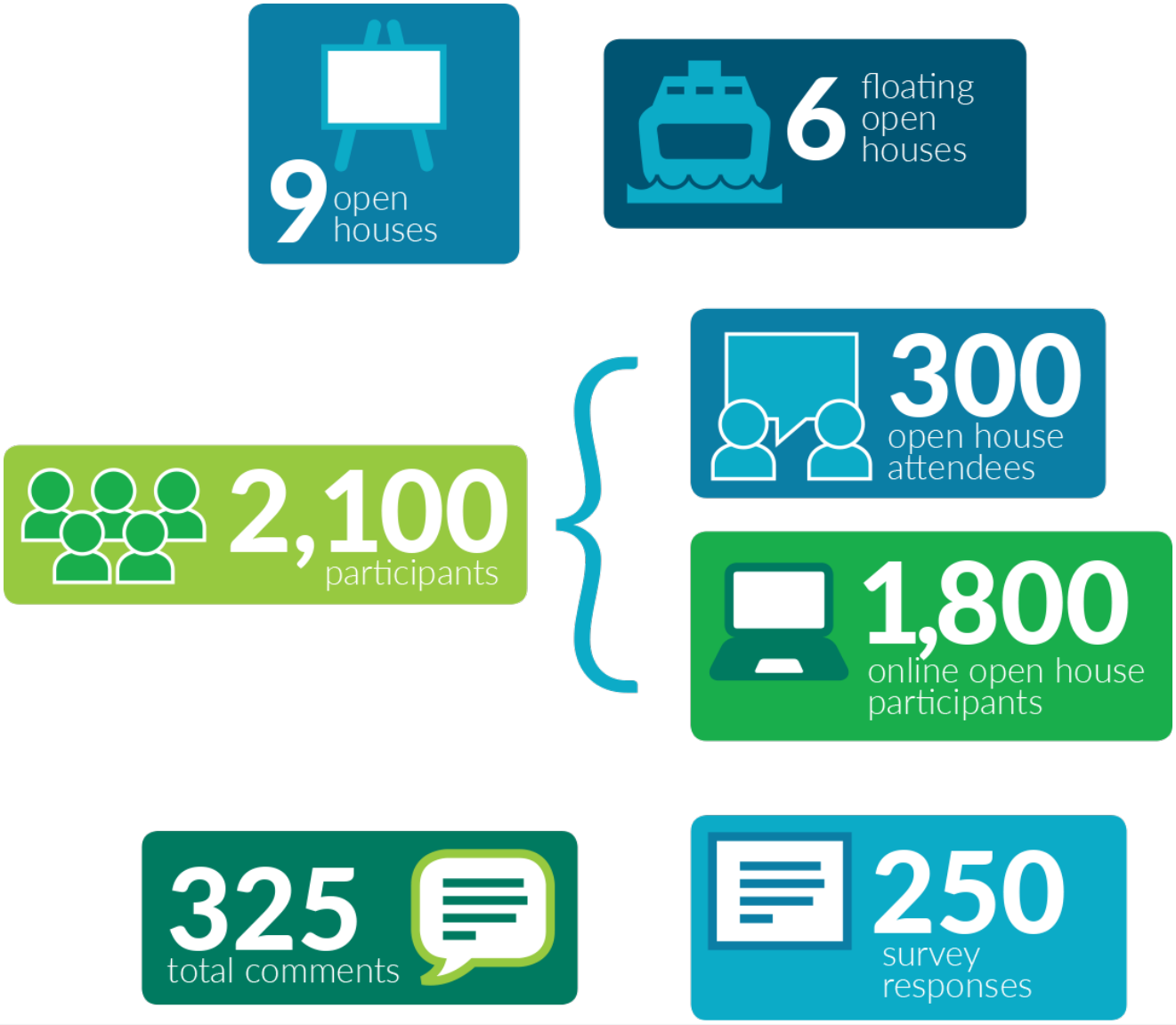
- 9 in-person open houses
- Online open house live from April 10- May 24

WSFlongrangeplan.com



Getting the word out

Community engagement



What we've heard

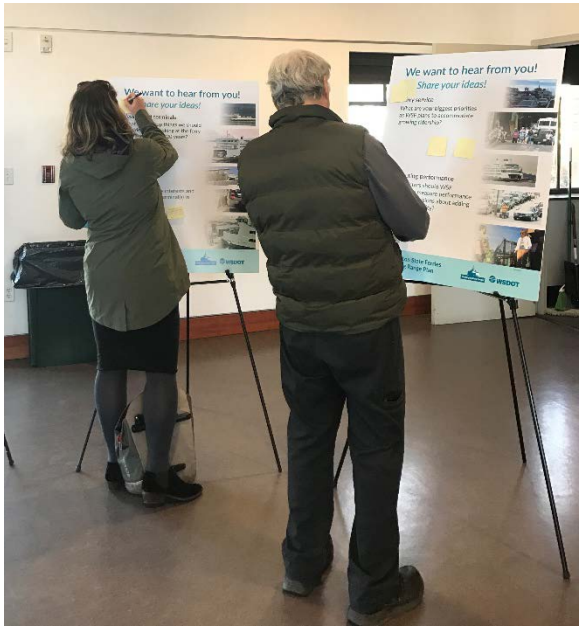
Key themes:

- Reliability
  - Prioritize building new ferries and invest in maintenance so ferries don't break down as often
  - Provide reliable service (no matter what)
  - Seek stable funding
- Plan for growth
  - Increase ferry service and add routes
  - Evaluate strategies such as vehicle reservations and adjusting schedules
  - Build more ferries and improve terminals
  - Questions about growth

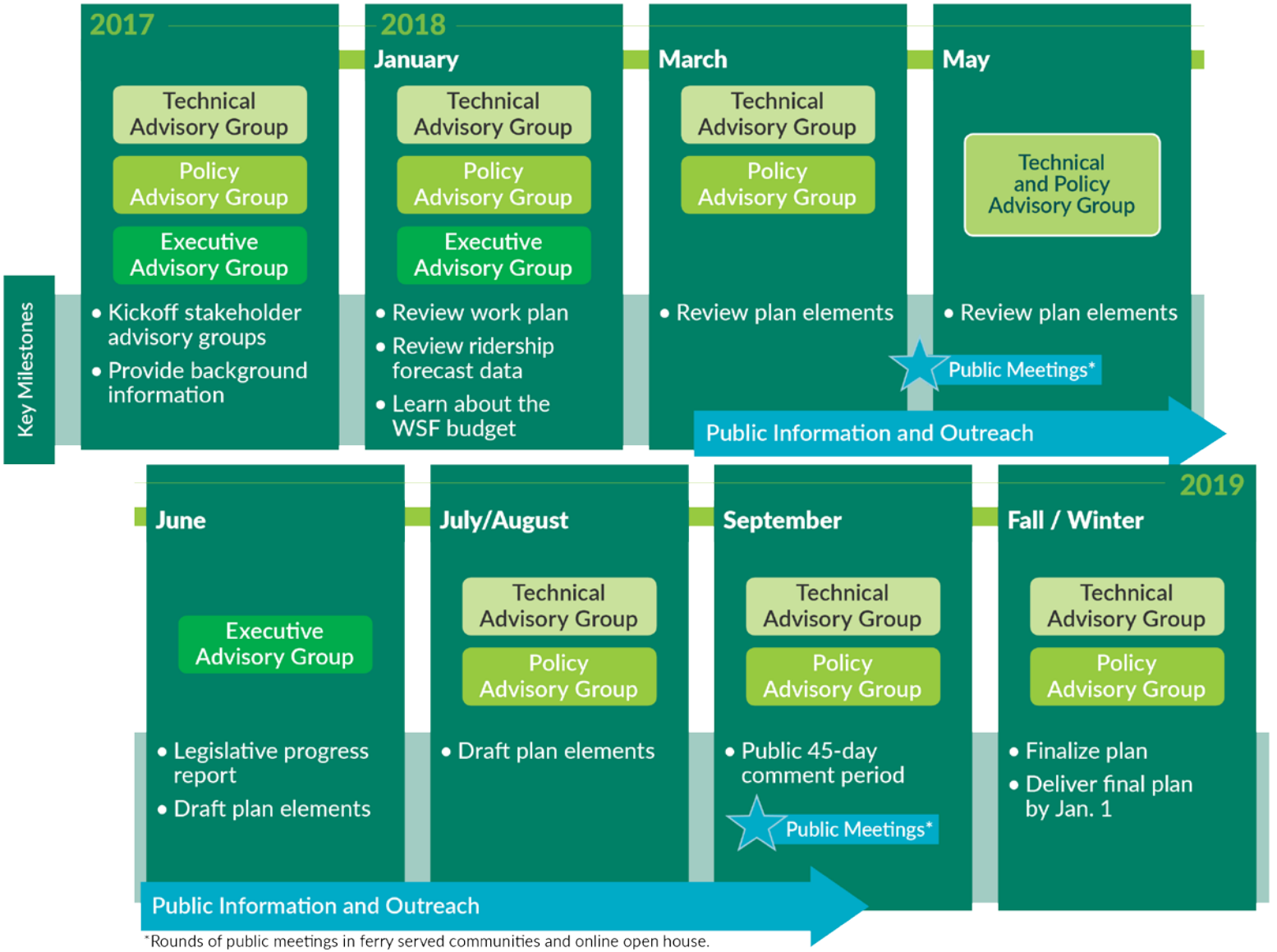
What we've heard

Key themes continued:

- Accessibility and multimodal connections
  - Ensure accessibility for all users
  - Improve connections to transit
  - Better walking, biking, parking, and carpooling amenities
- Technology and customer experience
  - Improve ticket technology and wi-fi
- Sustainability and resiliency
  - Reduce carbon-emissions
  - Prepare for climate change and emergencies



Timeline



*Rounds of public meetings in ferry served communities and online open house.

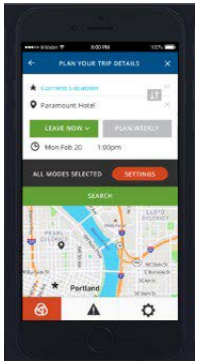
Key findings and preliminary recommendations

- Technology
  - Assessment
  - Preliminary recommendations
- Vessel maintenance and replacement
  - Assessment
  - Preliminary recommendations
- Level of service
  - Current standards
  - Preliminary recomendations

Technology assessment: gap analysis

Gap analysis findings

- Need for integrated systems
- Ability to manage and analyze data is limited
- Customer information is incomplete
- Reliance on manual processes
- Electronic fare system needs upgrading
- Need for accurate and reliable passenger counting
- Communications infrastructure needs updating
- Managing specialized assets is challenging
- Landside infrastructure outside of WSF purview
- Opportunities to convert vessels to hybrid/electric



Technology assessment: priorities

Key priorities

Reliability

- Provide seamless and predictable customer planning, booking, ticketing, and traveling
- Support customers before and during travel with targeted, useful, and accurate trip information and alerts
- Improve data and technologies that enhance safety and security

Efficiency

- Use technology to load ferries more efficiently and spread demand across peak periods
- Improve operational efficiency with better data capture, management, and analytics
- Efficiently manage and apply technology investments and resources

Sustainability

- Plan strategically to upgrade and replace legacy systems
- Use technologies to improve WSF's environmental footprint

Technology assessment: recommendations

Preliminary recommendations to WSF

Near term (0-5 years)	Mid term (5-10 years)	Long term
• Upgrade ticketing and reservations • Improve terminal queue detection and wait times • Refresh website • Improve customer alerts • Convert vessels to hybrid/electric • Vessel, terminal, and IT asset management system • Vessel automation systems**	• Update vessel communication system • Implement automatic passenger counting • Improve terminal wayfinding and real time passenger information • Upgrade common schedule database	• Provide real time parking information • Provide real-time vessel monitoring system* • Implement automatic passenger counting-vehicles** • Detect vehicle length automatically**

*** Indicates that this investment ranges in priority (e.g. moderate to high)**

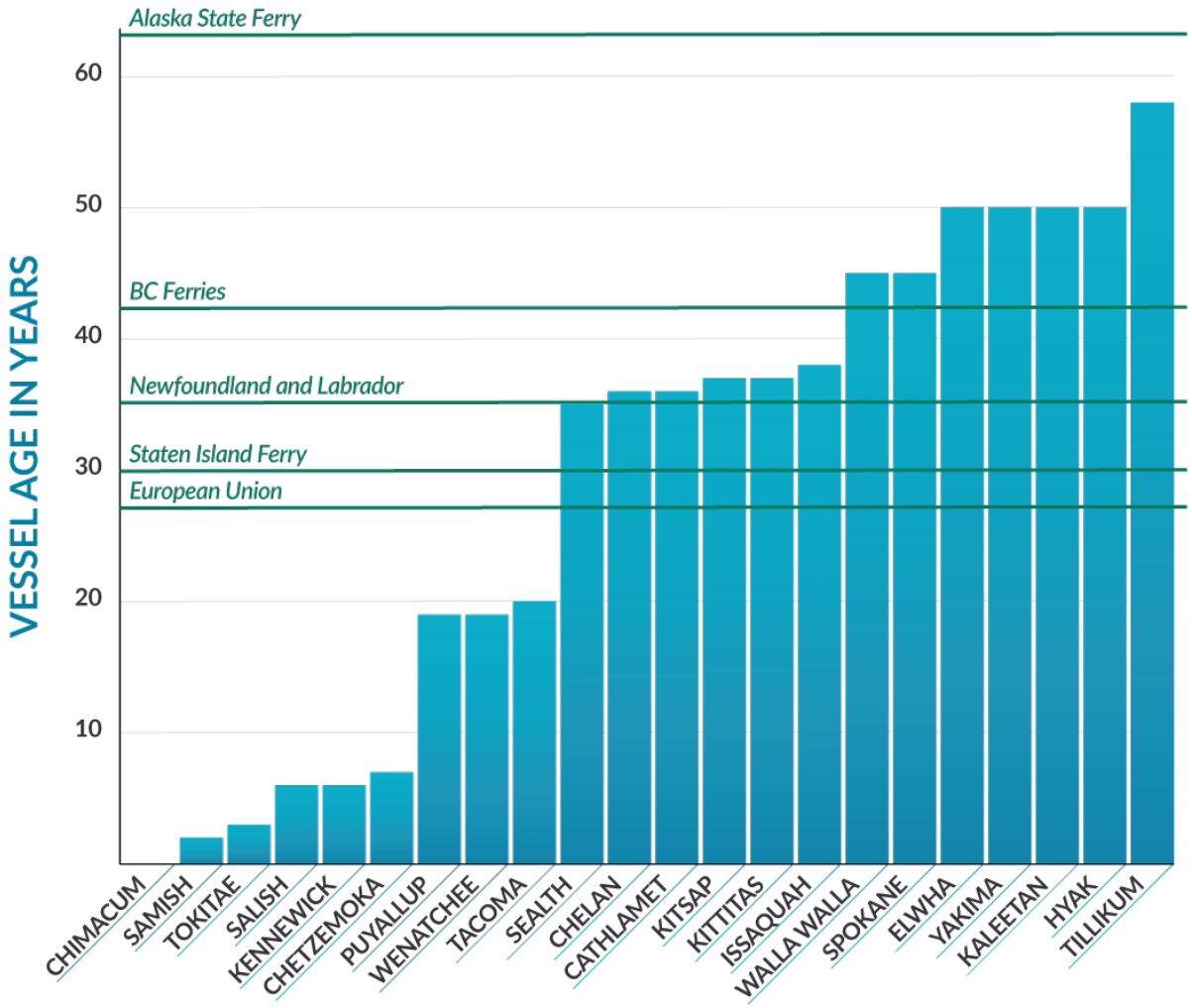
Q & A

Vessel maintenance and replacement assessment

State of the fleet

- Lack of funding
- Prioritizing maintaining service over maintenance
- Lack of relief vessels to perform required maintenance
- Aging fleet
- High utilization

Vessel age compared to other systems' vessel retirement age

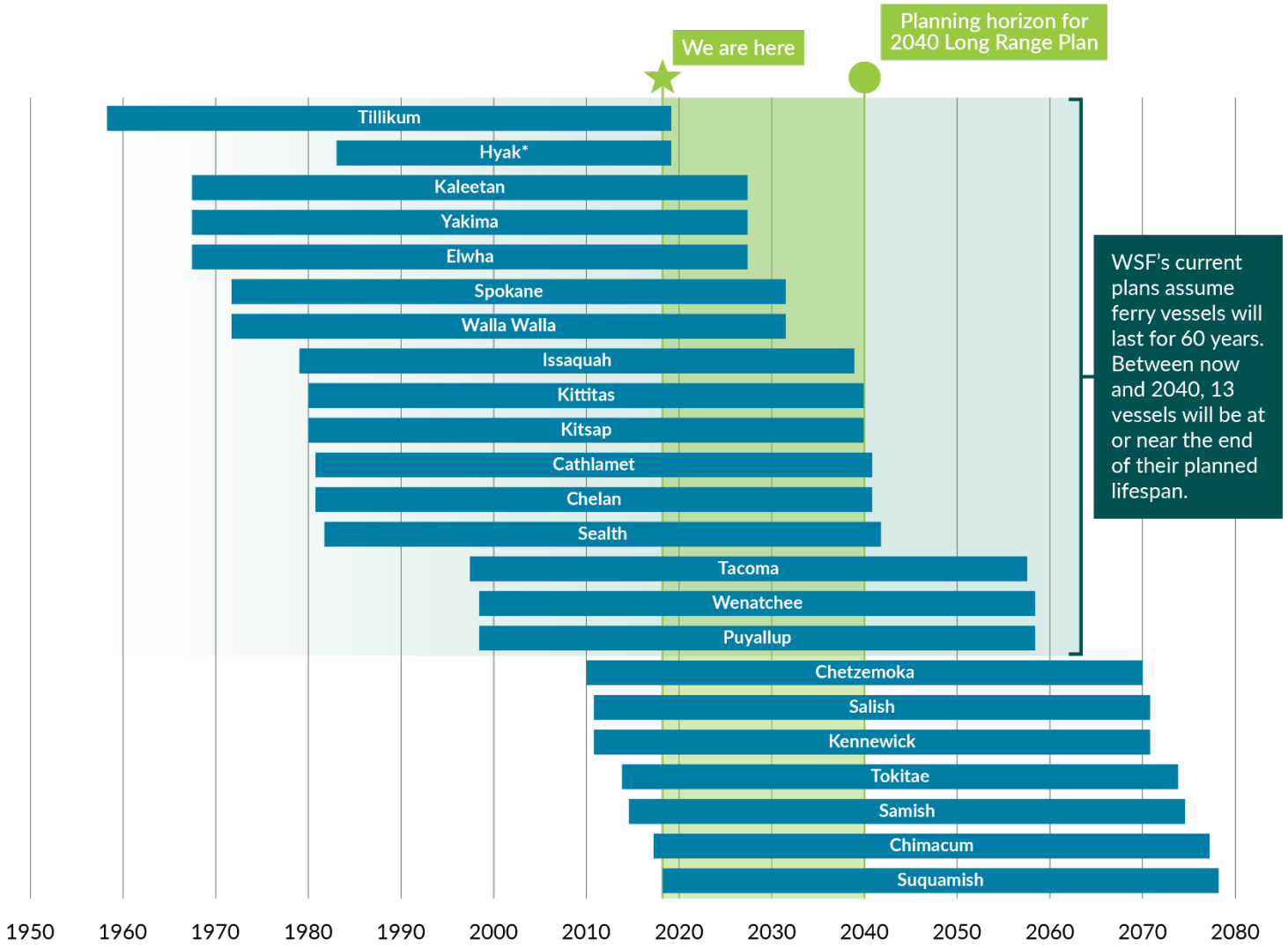


Vessel maintenance and replacement assessment

Key constraints:

- Shipyard availability
- Lack of reserve fleet
- Dedicated funding for vessel replacement program

Current vessel retirement schedule



*Hyak did not have a mid-life refurbishment. It is scheduled to be retired in 2019.

Vessel maintenance and replacement assessment

Preliminary recommendations to WSF to stabilize the fleet:

- Build new Olympic Class vessel(s) immediately, in service by 2022/2023
- Build new ferries with hybrid and electric power and retrofit Jumbo Mark II Class
- Implement comprehensive, large-scale construction program that maximizes efficiency and builds vessels in sequence
- Replace Issaquah Class ahead of Jumbo Class

Policy review:

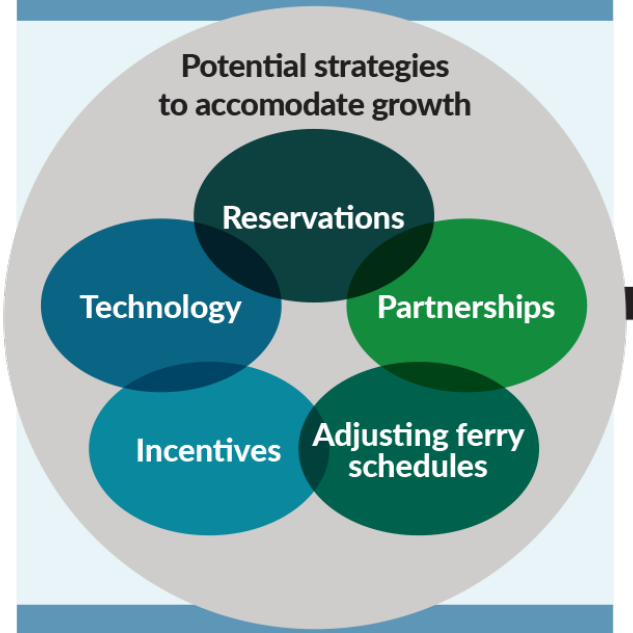
- Vessel service lifespan
- Contracting restrictions on shipyard contracts to streamline building process
- Public education and outreach campaign on the state of the ferry system and its importance to economy

Q & A

Current level of service standards

Collect vehicle ridership forecasts by route for January, May and August

Is vehicle capacity full on 25-35 percent of sailings in these months?



Tier 1

Is vehicle capacity full on 50-85 percent of sailings in these months

Add vehicle capacity

- larger vessels
- additional sailings

Tier 2

Level of service recommendations

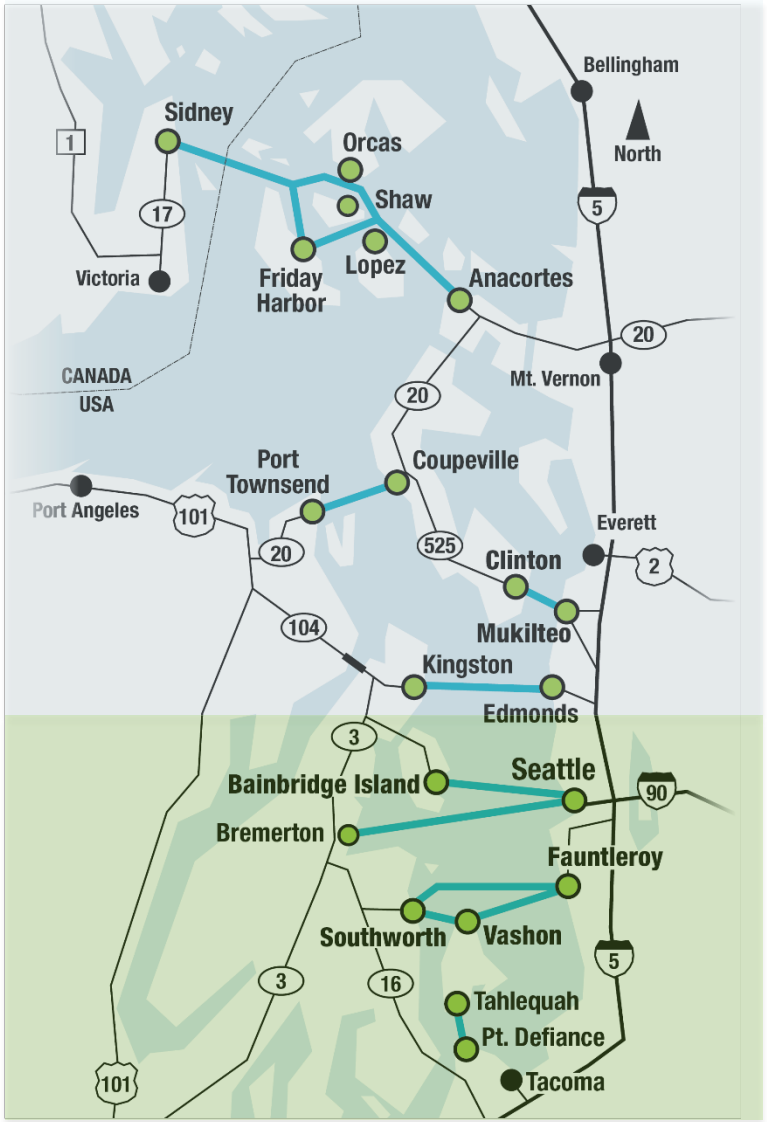
Preliminary recommended changes to LOS standards:

- Revise vehicle criteria:
  - On routes with reservations, measure space available for reservations instead of total vessel capacity
- Add passenger criteria:
  - Accommodate all walk-on passengers
  - LOS for bicycles?
  - Two tier approach
    - Level 1: Use vessel indoor seated capacity (could differ by route depending on length of crossing)
    - Level 2: Use total passenger capacity

Route-by-route service levels

North Puget Sound routes:
Heavier vehicle congestion

South Puget Sound routes:
Heavier passenger congestion, some vehicle congestion



Q & A

Lunch break

Existing performance metrics

Financial

- Annual operating cost
- Overtime hours
- Fuel consumption

Asset Management

- Average time vessels out of service

Operations

- Passenger and crew injuries
- Customer satisfaction
- On-time performance
- Service reliability

Capital Project Delivery

- Percent of terminal projects completed on time and within budget
- Percent of vessel contracts completed on time and within budget
- Preliminary engineering costs (% of capital cost)

Performance metrics recommendations

Preliminary recommendations to WSF:

- Revise existing metrics:
  - Vessel maintenance (out of service time)
  - Late departures (on-time performance)
- Add new metrics:
  - Vessel reliability
  - Queue length, peak period wait times
  - Dwell time by route
  - Greenhouse gas emissions

Seismic assessment and emergency preparedness

Preliminary recommendations to WSF:

Seismic assessment

- Identify and prioritize seismic upgrades
- Incorporate into asset management program
- Seek opportunities and clarity around funding requirements

Emergency preparedness

- Establish priority routes for repair (underway)
- Identify funding sources related to emergency preparedness
- Identify alternative landing sites
- Fuel supplier emergency access plan
- Increase number of spare vessels
- “Side-loading” engineering analysis
- Emergency staffing and communication planning

Sustainability

Preliminary recommendations to WSF:

- Executive orders
  - Begin transition to zero-carbon emission fleet
  - Quiet ferries to reduce impact to Orca whales
- Terminals and facilities
  - Reduce idle time for queued vehicles
  - Improve facilities' energy efficiency
- Vessels
  - Reduce fuel consumption and electrify fleet

Review of local and regional plans

WSF reviewed local plans to assess how areas around terminals are likely to change. We asked three questions:

1. Do local plans support ferry service and the facilities needed?
2. Will development increase congestion and create operational challenges?
3. Are transit and non-motorized connections adequate to support a shift to non-single occupancy vehicle modes?

Review of local and regional plans: key findings

Policies in local plans:

- Policies in local plans are generally supportive of inter-modal connections.
- Terminals are in constrained locations where improvements may be difficult.

Impacts from expected development:

- Rapid growth is causing increased congestion across the region.
- Access to some terminals will become more difficult.

Transit and non-motorized connections:

- Strong transit connections at Colman Dock, Edmonds, Mukilteo, Clinton, Bainbridge and Bremerton, less frequent service at other terminals.
- Non-motorized connections vary greatly, plans include an expanded network.

Small group discussions

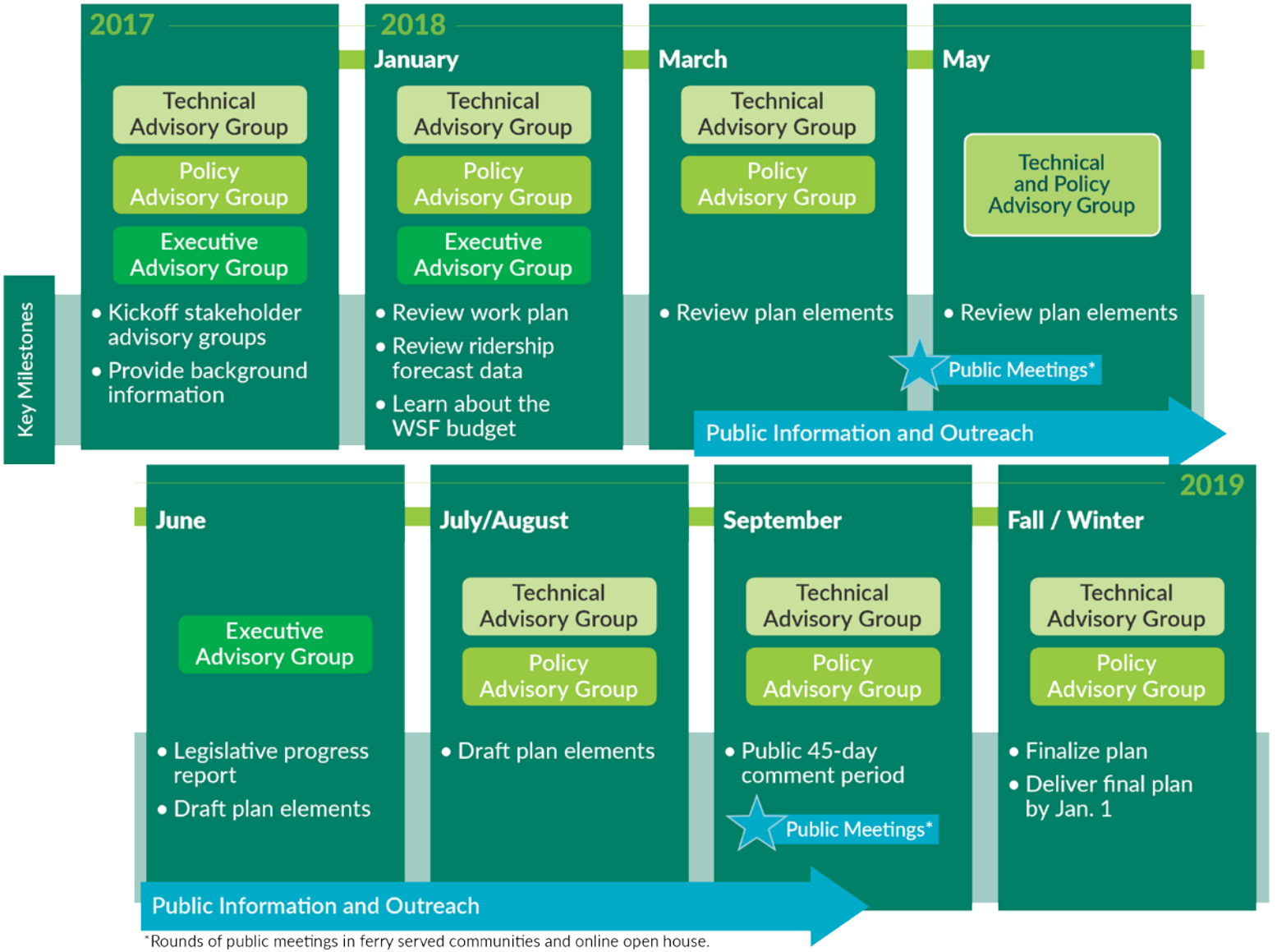
Session 1

- Group 1: Route-by-route service scenarios
- Group 2: Vessel maintenance and replacement

Session 2

- Group 1: Vessel maintenance and replacement
- Group 2: Route-by-route service scenarios

Look ahead



*Rounds of public meetings in ferry served communities and online open house.