WSDOT/WASHINGTON STATE FERRIES

Investigation into the collision between the M/VHYAK and the M/YTASYA on September 13, 2013 at the confluence of Harney Channel and Upright Channels in the San Juan Islands

Board Of Inquiry

10/25/2013

Signature Page

Board of Inquiry Chairperson Darnell Baldinelli Safety Systems Manager Washington State Ferries	Board of Inquiry Member Captain Kelly Mitchell Senior Port Captain Washington State Ferries
Board of Inquiry Member Scott Mullan Port Engineer Washington State Ferries	Board of Inquiry Member Captain Stephen Hopkins Staff Master Washington State Ferries
Board of Inquiry Member John Milton, PhD, PE Director Enterprise Risk and Safety Management Washington State Department of Transportation	
Review By: Captain George Capacci Deputy Chief, Operation and Construction Washington State Ferries	
Approved By: David Moseley Assistant Secretary Washington State Ferries	

Executive Summary:

On September 13, 2013 at 13:38:14 local Standard Pacific Time the Washington State Ferries (WSF) M/V HYAK collided with the motor yacht (M/Y) TASYA at the confluence of Harney and Upright Channels in the San Juan Islands, Washington. The collision occurred as the M/V HYAK was overtaking the M/Y TASYA from its stern. The M/V HYAK's starboard bow collided with the port quarter of the M/Y TASYA. The M/Y TASYA's hull was breached and it immediately began taking on water. The lone occupant of the vessel was rescued by a nearby small vessel and the occupant was transported to Orcas Island. The M/Y TASYA was later taken in tow by a Washington State Department of Fish and Wildlife vessel. However, while in tow the M/Y TASYA sank in the vicinity of Harney Channel. That same day WSF convened a Board of Inquiry to investigate the incident. The Board of Inquiry collected a wide array of data and information which included video from security cameras on board the M/V HYAK, Voyage Data Recorder (VDR) data from the M/V CHELAN, Automatic Identification System (AIS) voyage tracking data, witness interviews, procedures and policies, vessel construction plans, photographs, and training records. As a deliberative body the Board of Inquiry spent in excess of thirty hours meeting to examine evidence and develop causal factors and root causes. The Board of Inquiry concluded that this incident was avoidable as the M/V HYAK had adequate time, equipment capability and "sea room" to avoid the collision. Weather, visibility, tides and currents were not factors in this incident. The Board of Inquiry determined that the root cause of this incident was human error due to lack of situational awareness. Specifically, the Captain's lack of situational awareness in combination with the Second Mate's inexperience at the helm of the M/V HYAK resulted in an In-Extremis situation and eventual collision. The Board of Inquiry also produced six recommendations that address potential system wide improvements that could help prevent future incidents of a similar type.

Investigative Methodology:

In accordance with WSF's Safety Management System (SMS) policy SMSM SAFE 0100 a Board of Inquiry was chartered on September 13, 2013. The Board of Inquiry was a cross departmental team of senior managers. The members were:

Board of Inquiry Chairperson
Darnell Baldinelli
Safety Systems Manager/Designated Person Ashore
Washington State Ferries

Board of Inquiry Member
Captain Kelly Mitchell
Senior Port Captain
Washington State Ferries

Board of Inquiry Member
Scott Mullan
Port Engineer
Washington State Ferries

Board of Inquiry Member
Captain Stephen Hopkins
Staff Master
Washington State Ferries

Board of Inquiry Member
John Milton, PhD, PE
Director Enterprise Risk and Safety Management
Washington State Department of Transportation

The Board of Inquiry used the American Bureau of Shipping's (ABS) Marine Root Cause Analysis Technique (MaRCAT) investigation methodology as a guide in the Board's deliberations. The ABS MaRCAT approach to incident investigations was particularly helpful because the methodology is designed specifically to address many of the unique aspects of the marine industry, including human element, machinery and engineering, and structural elements. The MaRCAT methodology uses tools such as causal factor charting, fault tree analysis and the 5 Whys technique to identify the casual factors of an incident. The Board used a combination of these techniques in its analysis and found them helpful in identifying the questions that needed to be answered to understand the incident and its causes. Once the casual factors were identified

the Board used the ABS Marine Root Cause Analysis Map to identify the root causes (see Appendix 16). One of the principal advantages of using the map is that it facilitates consistency in the identification of root causes. A complete explanation of the MaRCAT methodology and the ABS Marine Root Cause Analysis Map can be found in the *Guidance Notes on The Investigation of Marine Incidents, June 2005*, at www.eagle.org/eagleExternalPortalWEB/ShowProperty/BEA%20Repository/Rules&Guides/Current/142_InvestigationofMarineIncidents/Pub142_InvestMarineIncidentsGuide

In its deliberations the Board collected a wide array of data and information which included video from cameras on board the M/V HYAK, Voyage Data Recorder (VDR) data from the M/V CHELAN, Automatic Identification System (AIS) voyage tracking data, witness interviews, procedures and policies, vessel construction plans, photographs, and training records.

As a deliberative body the Board of Inquiry spent in excess of thirty hours meeting to examine evidence and develop causal factors and root causes. This report is also accompanied by a timeline to help communicate the Board's findings. The purpose of this report is to provide a formal record of the investigation process and as a means of documenting what was learned.

Findings of Fact:

On Friday, September 13, 2013, the M/V HYAK was assigned on the Anacortes/San Juan Island Washington State ferry route following the pattern as detailed in the summer sailing schedule (Attachment 1). The M/V HYAK has a gross tonnage of 2704 tons and is certified for a passenger capacity of 2017 persons. Other vessel particulars are contained in the latest US Coast Guard Certificate of Inspection dated 04 March 2013 (Attachment 2). The assigned M/V HYAK crew consisted of fourteen (14) personnel, ten (10) Deck Department and four (4) Engine Department (Attachment 3).

The deck department consisted of the following personnel:
Captain Patricia Whaley
Chief Mate Mark Desdier

Second Mate Kirsten Hervey
Able Seaman (A/B) James Bergen (assigned Quartermaster)
A/B Michael McCown
A/B Richard Closson
A/B Pat O'Neill
Ordinary Seaman (O/S) Jessica Christian
O/S Mason Sowdon
O/S Andrew Engom

Engineering department consisted of the following personnel:
Chief Engineer Loren Smith
Assistant Engineer Robert Stanford
Oiler Jan Bjolstad
Oiler Jonathon Hopkins

At the time of the incident the tidal stage was 1 minute after the high water of 8.6 feet at 13:37 hours based off of Upright Head, Lopez Island (Attachment 4). The current was 7 minutes after slack water based on Harney Channel indicating a near slack current (Attachment 5). Visibility at the time of collision was unrestricted and greater than one mile to island shoreline with light wind conditions based on witness statements from Captain Whaley (Attachment 7) and Second Mate Hervey (Attachments 8).

No mechanical deficiencies were reported aboard and all operating systems were operating normally, as stated in the witness statements from Captain Whaley and Second Mate Hervey. All navigation and electronic equipment was functioning effectively as per the electronic service report performed by Harris Electric on September 15, 2013 (Attachment 9) and statements from Captain Whaley.

Crew endurance was not a factor in this incident based on the 2013 Summer Deck Schedule for H watch (attachment 10). This was the second day of a shift consisting of four, ten hour days for the deck watch. There appeared to be adequate rest/sleep periods prior to the incident as

indicated in the Captain Whaley's and Second Mate Hervey's 96-Hour work/rest history worksheets (attachments 11 and 12). Members of the bridge team and engineering watch were alcohol and drug tested with negative results. (Attachment 13)

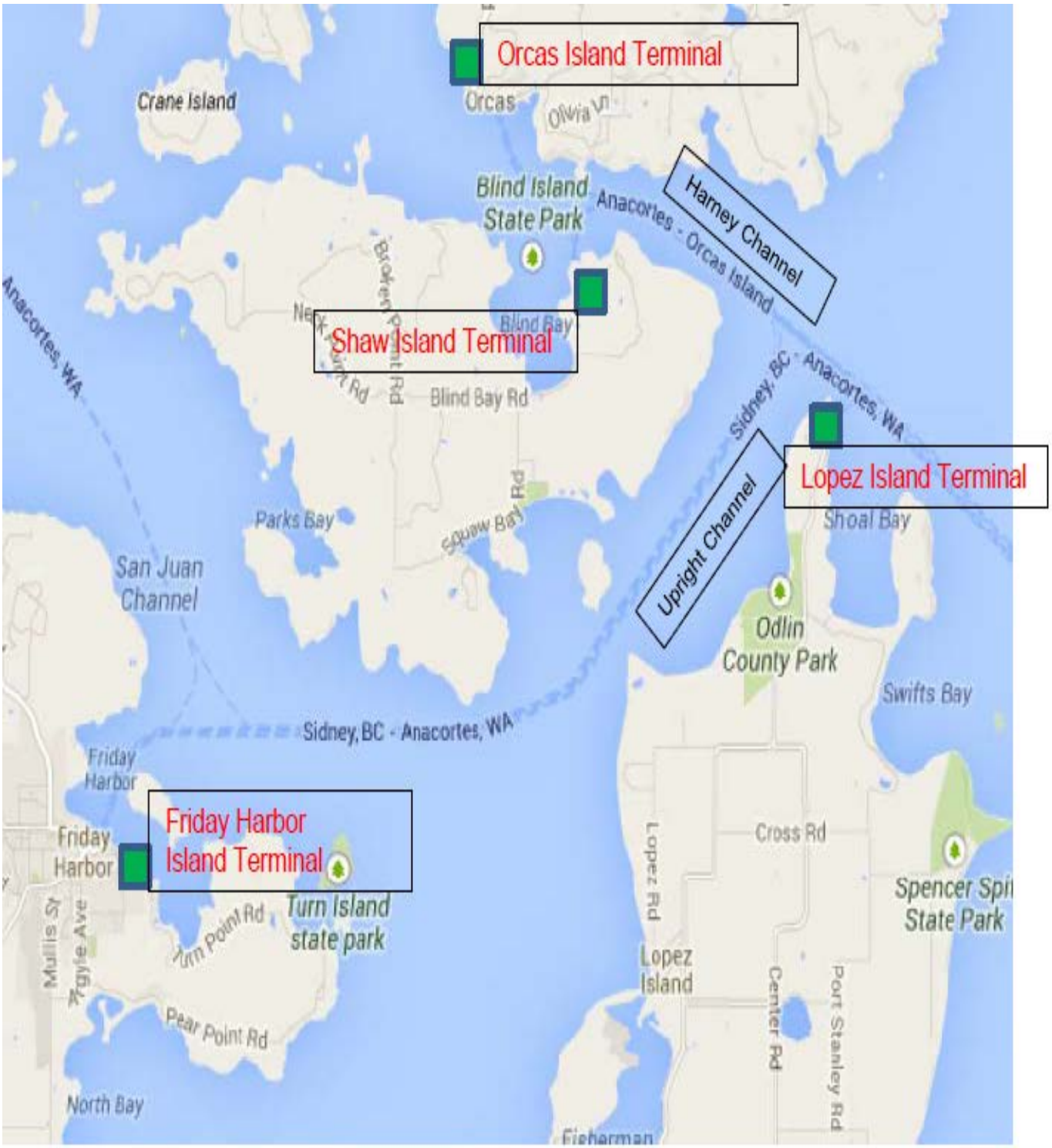
Timeline/Description of Incident (Attachment 15, all times given are for Pacific Daylight Time September 13, 2013): The following timeline is compiled from statements of those involved with the incident and objective evidence collected from numerous sources and represents the Board's best estimate of the sequence of events and the times.

13:30:00: The M/V HYAK was scheduled for departure from Lopez Terminal and in the Number 1 inshore wheelhouse was Captain Whaley, in charge of the Navigational Watch, and Second Mate Hervey was acting as the helmsmen. Able Bodied Seaman (AB) Bergen, who had been assigned as the Quartermaster and helmsman for the watch, was in the Number 2 offshore (end farthest from the dock) wheelhouse and acting as a lookout for the departure "V" maneuver. The "V" maneuver is analogous to backing a car out of a parking spot and then pulling forward towards your intended destination. As such, the departure from the Lopez Island Terminal requires the Navigational Watch to maintain control of the vessel from the inshore (the end closest to the dock) wheelhouse upon departure. For most other routes, the Navigational Watch and control of the engines are transferred to the offshore wheelhouse for departure. However, for departure from the Lopez Island terminal the ferry has to back out of the dock and swing the Number 1 end of the vessel around until it is pointing forward. When conducting the "V" maneuver it is standard operating practice to post a lookout in the offshore wheelhouse to ensure that no other vessels are in the path of the ferry as it is backing out.

Second Mate Hervey, who was not normally assigned as part of the Navigational Watch for this maneuver, had come to the Number 1 wheelhouse for training. The Second Mate had been with WSF approximately nine months. As part of the training, Second Mate Hervey was allowed to land the vessel at Lopez Island under Captain Whaley's supervision. For the departure to Orcas Island Terminal Captain Whaley assigned AB Bergen to be the Number 2 wheelhouse lookout and allowed Second Mate Hervey to remain at the helm. Second Mate Hervey had been a

helmsman on other WSF vessels and routes, and had been assigned to the Anacortes and Island routes approximately a month before the incident.

Overview of WSF ferry routes for Lopez, Orcas and San Juan Island



13:30:30: In preparation for departure, AB Bergen reports from the Number 2 wheelhouse to Captain Whaley that there is a small blue and white vessel (this is not the M/Y TASYA which was involved in the incident) about to pass astern of the M/V HYAK westbound. Captain Whaley delayed the M/V HYAK's departure. In interviews Captain Whaley and Second Mate Hervey stated that Chief Mate Desdier had been on the main deck directing traffic and after that they assumed that he went to attend to administrative duties and was not in the wheelhouse during the transit.

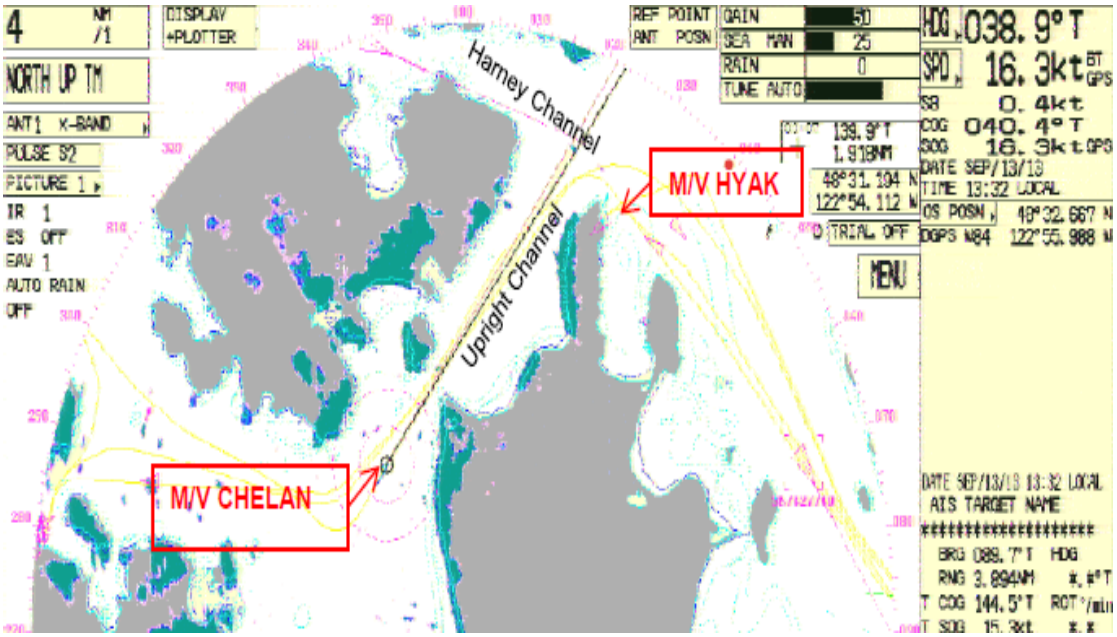
13:30:41: The M/V HYAK's [redacted] AB Bergen does not report the M/Y TASYA because the M/Y TASYA position and course didn't appear to pose a threat the M/V HYAK's V maneuver in backing out of Lopez Island.

13:31:54: [redacted]

13:32:39: The M/V HYAK begins to back out of the Lopez Island dock and begins the "V" maneuver. The M/V CHELAN was proceeding northward in Upright Channel at the time of the M/V HYAK was completing the "V" maneuver and departing from Lopez Terminal. The M/V CHELAN is equipped with a Vessel Data Recorder (VDR). The VDR is a data recording system designed for vessels required to comply with the IMO's International Convention SOLAS Requirements. The VDR collects data from various sensors on board a vessel, then digitizes, compresses and stores this information in an protective storage unit. The protective storage unit is tamper-proof and designed to withstand extreme shock, impact, pressure and heat, which could be associated with a marine incident (fire, explosion, collision, sinking, etc.). There are only two WSF ferries equipped with VDR, the M/V CHELAN and M/V ELWHA. The installation of VDRs is a requirement for any vessel engaged in an international voyage, and currently only the M/V CHELAN and M/V ELWHA are assigned to the Sidney, British Columbia Canada international route. The M/V HYAK is not equipped with a VDR. However, all WSF ferries are equipped the Automatic Identification Systems (Fleet Track) which records the latitude,

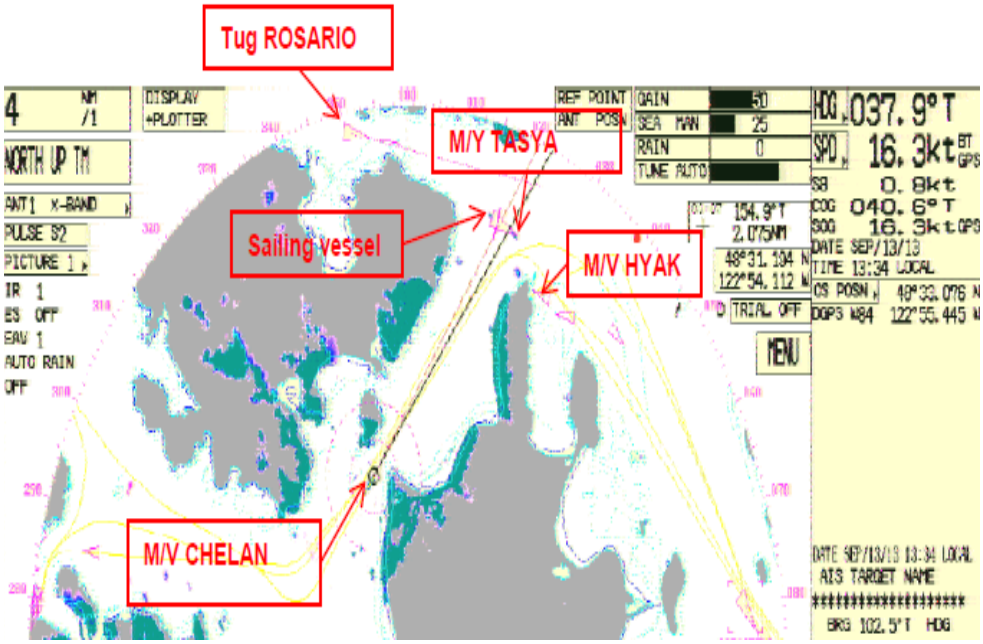
longitude, course and speed over ground (Attachment 16). The following images were taken from the M/V CHELAN's VDR and used in this investigation.

Voyage Data Record Screen Shot From M/V CHELAN, 13:32 Local Time



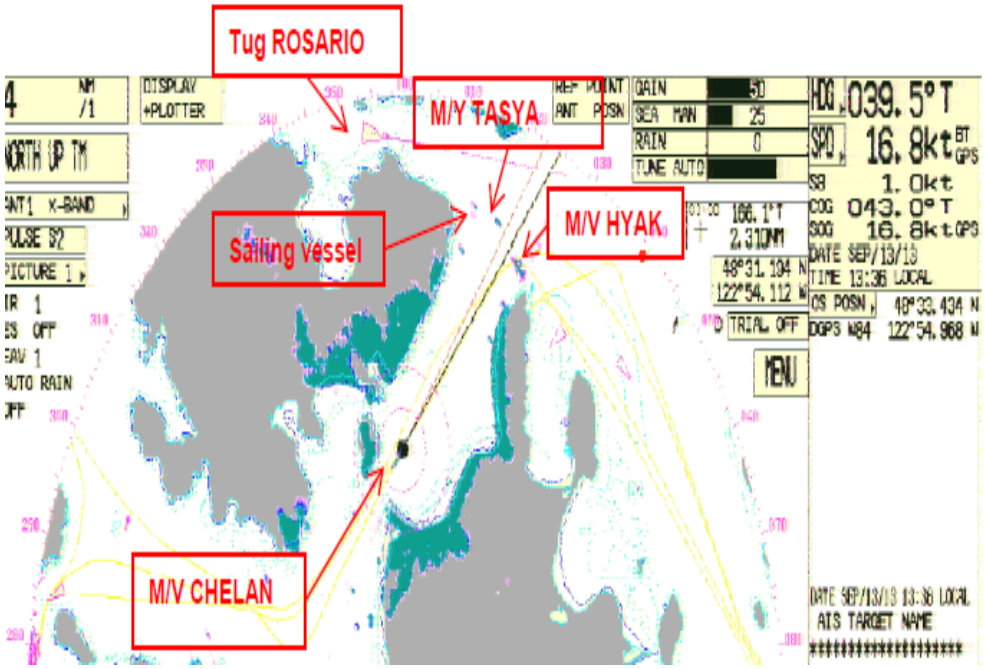
13:34:41: The M/V HYAK completed the "V" maneuver and the Number 1 end was in command and was now pointed in northwesterly direction enroute Orcas Island Terminal. Captain Whaley puts the Engine Order Telegraph (EOT) to Full Ahead. The M/V HYAK eventually built to a speed of 18 knots just prior to the collision. This time is verified by a security camera which captures the propeller wash from the stern of the M/V HYAK. In her interview Captain Whaley said that she saw a tug and tow, and two small vessels directly in front of, and on the M/V HYAK's intended route to the Orcas Island Terminal.

Voyage Data Record Screen Shot From M/V CHELAN, 13:34 Local Time



13:36:00: [redacted] At approximately the same time the M/V CHELAN acquires the M/Y TASYA on the M/V CHELAN's radar as depicted in the VDR image below.

Voyage Data Record Screen Shot From M/V CHELAN, 13:36 Local Time



Captain Whaley stated that one of the two small vessels was under sail and the other was under power. Captain Whaley stated that her plan was to go between the two small vessels and keep the tug and tow on the port side. She instructed the Second Mate Hervey to leave the M/Y TASYA to starboard while putting the other small vessel and tug and tow to port of the M/V HYAK. The M/Y TASYA was underway at a speed of approximately 6.5 knots. The picture below is graphical representation of the Captain Whaley's transit plan. This picture is not drawn to scale and is provided to orient the reader to the relative positions of the vessels in relationship to each other.

Graphical Representation of Captain Whaley's Transit Voyage Plan

13:36:47: AB James Bergen [redacted] AB James Bergen [redacted]

13:37:07: Captain Whaley initiates a radio call to the towing vessel ROSARIO to make a port-to-port passing arrangement. This conversation is recorded by the U.S. Coast Guard Vessel Traffic Service. According to the statements given by both Captain Whaley and Second Mate Hervey, after making passing arrangements with the towing vessel ROSARIO, the Captain returned to the radar and was looking down into the radar for approximately one minute before the incident with the M/Y TASYA.

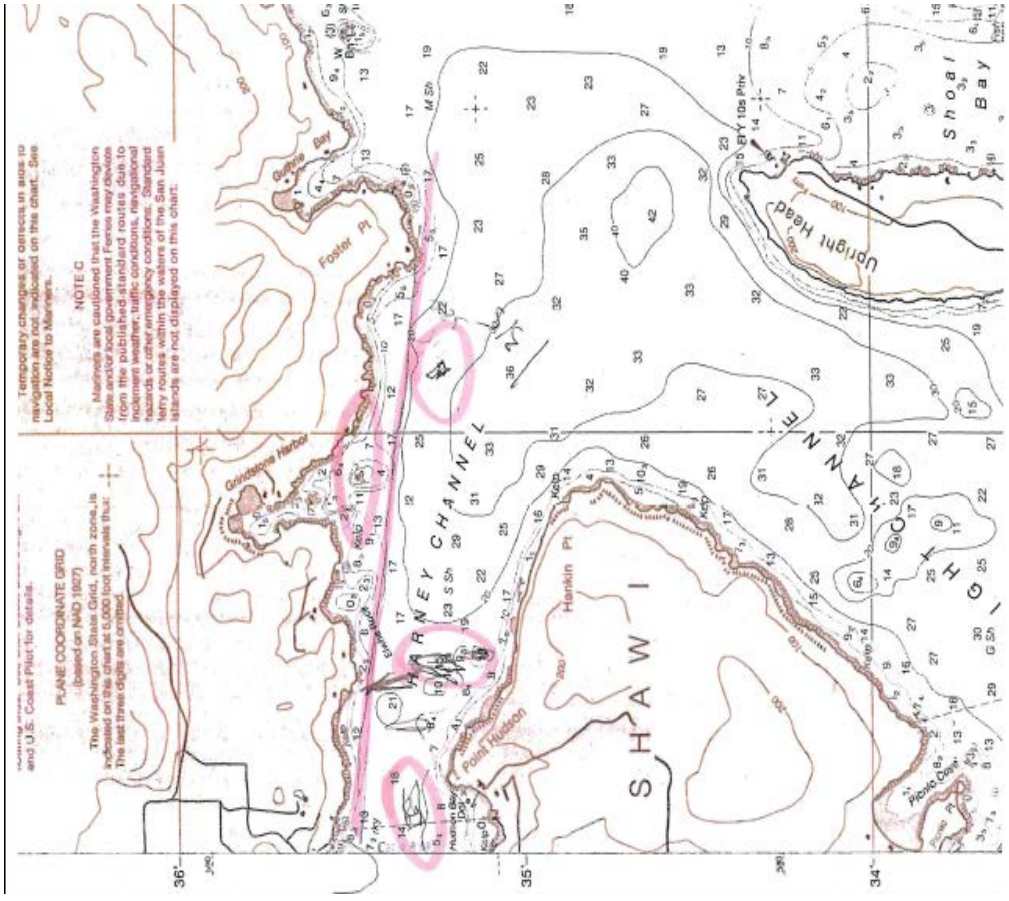
13:37:56: [redacted] According to statements given by both Captain Whaley and Second Mate Hervey, at some point just before this alteration to starboard Second Mate Hervey advised Captain Whaley that the M/V HYAK was getting close the M/Y TASYA, at which point Captain Whaley instructed Second Mate Hervey to "come to port and sound the whistle if you deem it necessary." According to statements given by both Captain Whaley and Second Mate Hervey, Second Mate Hervey put the rudder an indeterminate amount to starboard instead of port. The rudder was to starboard for approximately four seconds.

13.38:05: [redacted] According to statements given by both Captain Whaley and Second Mate Hervey, Captain Whaley looked over and saw that Second Mate Hervey had responded with the wrong rudder command at which point Captain Whaley ran to the Engine Order Telegraph and ordered the engines full astern. Captain Whaley also ordered Second Mate Hervey to put the helm hard to port. Captain Whaley relieved Second Mate Hervey from control of the helm.

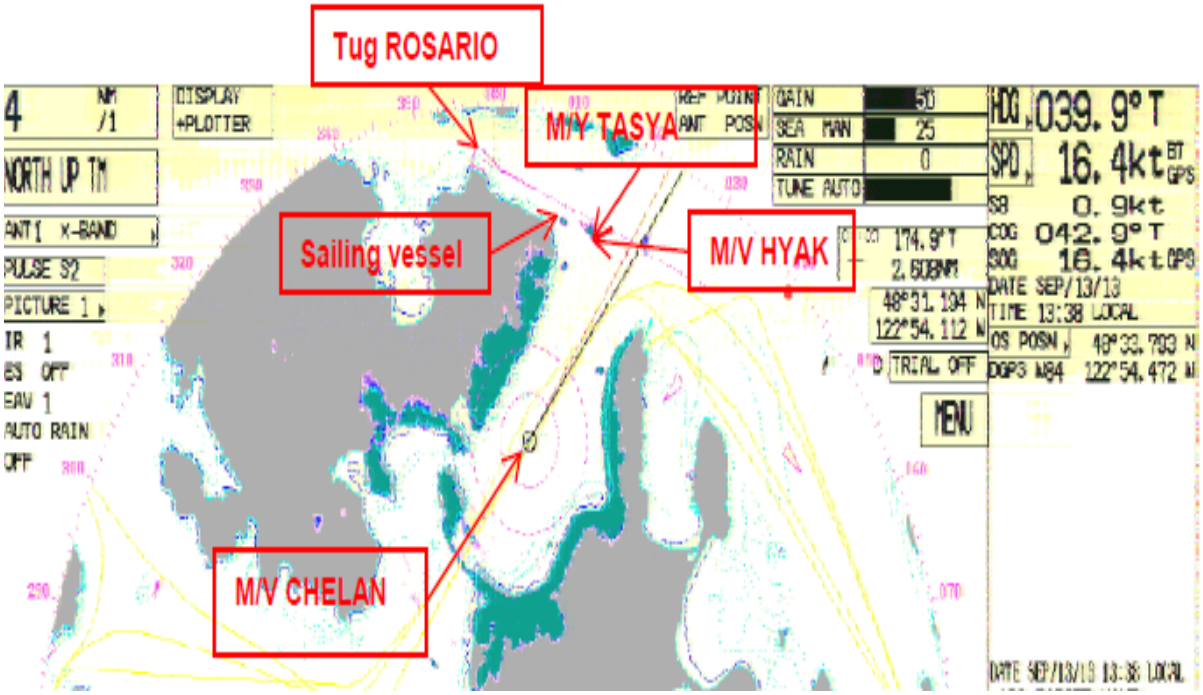
13:38:08: [redacted] According to statements given by AB Bergen, he arrived in the wheelhouse just as Captain Whaley realized that Second Mate Hervey had put the helm in the wrong direction and heard the exchange between them. According to statements given by Captain Whaley, Second Mate Hervey and AB Bergen, there was agreement that Second Mate Hervey understood the rudder command but applied the wrong rudder direction.

13:38:14: [redacted] The M/Y TASYA was impacted on its port quarter. The M/V HYAK continued to back full astern and the bow fell off to port. Captain Whaley made written and verbal statements to the U.S. Coast Guard and the Board of Inquiry that placed the location of the collision farther north and west in Harney Channel than has been identified by objective evidence. In her statements to the board of inquiry, Captain Whaley indicated that the M/Y TASYA was West of Foster Point, closer to Grindstone Harbor. However, VDR images from the M/V CHELAN and data from Fleet Track clearly indicate that the collision actually occurred farther South and East in the less restrictive waters in the middle of the confluence of Harney and Upright Channels.

Attachment 14, Captain Whaley's Hand Drawn Representation of the Location of the Incident



Voyage Data Record Screen Shot From M/V CHELAN, 13:38 Local Time



13:40:00: The M/Y TASYA's hull was breached and it immediately began taking on water. The lone occupant of the vessel was rescued by a nearby small vessel and the occupant was transported to Orcas Island. The M/Y TASYA was later taken in tow by a Washington State Department of Fish and Wildlife Marine Unit 10. At 14:14 local time Marine Unit 10 reported to the U.S. Coast Guard that while in tow M/Y TASYA sank in the vicinity of Harney Channel at North 48.34.07 and West 122.53.30 in approximately 250 feet of water.

Casual Factors and Root Cause Analysis: In its deliberation the Board of Inquiry conducted an extensive review of the causal factors and root causes for this incident. The table below represents the Board's analysis. The numbers in parentheses in the table correspond to the ABS Maritime Root Cause Analysis Map (Appendix 17). A description of the applicable International Regulations for the Prevention of Collision at Sea 1972 (72 COLREGS), Navigation Rules reference in the Root Cause Description column of the table are found in Appendix 18.

Casual Factors	Path Through the ABS Maritime Root Cause Analysis Map	Root Cause Description
1. The Quarter Master assigned to lookout in the offshore pilot house did not report the M/YTASYA.	• Human (4) • Company Employee, Relief AB (12) • Communication (220) • Bridge Team Management (235) • Information Not • Communicated (237) • Tolerable Risk (262)	Reporting of the TASYA may have increased the Captain's situational awareness. Had the 2nd Mate been assigned to the lookout in the offshore wheelhouse, instead of the Quarter Master, her relative inexperience may have caused her to report all contacts. Whereas the Quarter Master with his much greater experience reported only the contacts he deemed important to safely complete the "V" maneuver, while he omitted those he thought were not important instead of allowing the Captain to make the decision.
2. The assigned Quarter Master had to walk from the offshore pilot house to the active wheelhouse.	• Human (4) • Company Employee, Relief AB (12) • Operation/ Job Supervision (206) • Preparation (207) • Personnel Selection/ Assignment Issue (213) • Industry Standard Issue (266) • Situation Not Addressed by Standard (267)	Had the Quarter Master been at the helm at the time of the incident, and not walking back from his assignment as the lookout in the offshore wheel house, his experience may have helped avert the incident.
3. The M/V HYAK was required to conduct the "V" maneuver for its departure from the Lopez Island Terminal, which means that the Captain and 2nd Mate were impeded by a blind spot astern and were dependent on complete and accurate information from the lookout in the offshore	• External Factor (5) • Human Factor (143) • Situational Awareness (150) • Information Incomplete (151) • Industry Standard(266) • Situation Not Addressed by Standard (267)	Had the 2nd Mate and Captain been able to use the offshore wheelhouse for departure from Lopez Island they both would have had constant visual contact of vessels on their intended route and better situational awareness. *This root cause may have been a factor in the incident but the relative risk is acceptable.* *This is the first time that the*

pilot house.		*"V" has been identified as a factor.*
4. The Captain may have mistakenly identified another vessel for the M/Y TASYA when developing her transit plan.	• Human (4) • Permanent Crew (10) • Human Factor (143) • Situational Awareness (150) • Information Unverified (154) • Inappropriate Standard Applied (270)	The Captain did not comply with Navigation Rule 7 (Risk of Collision) and Rule 13 (Overtaking).
5. The Captain failed to maintain situational awareness and lost track of the M/Y TASYA.	• Human (4) • Permanent Crew (10) • Human Factor (143) • Situational Awareness (150) • Information Inaccurate (152) • Inappropriate Standard Applied (270)	The Captain relied solely on the radar. The Captain had a transit plan but did not adequately monitor the changing situation The Captain did not comply with Navigation Rule 7 (Risk of Collision).
6. When developing her transit plan the Captain placed the M/Y TASYA farther north and west than where the vessel actually was.	• Human (4) • Permanent Crew (10) • Human Factor (143) • Situational Awareness (150) • Information Inaccurate (152) • Inappropriate Standard Applied (270)	The Captain relied solely on the radar. The Captain had a transit plan but did not adequately monitor the changing situation The Captain did not comply with Navigation Rule 6 (Safe Speed), Rule 7 (Risk of Collision), and Rule 13 (Overtaking).
7. The Captain did not plot any vessels on the route of her transit plan	• Human (4) • Permanent Crew (10) • Human Factor (143) • Situational Awareness (150) • Information Inaccurate (152) • Inappropriate Standard Applied (270)	The Captain did not comply with Navigation Rules 6 (Safe Speed), Rule 7 (Risk of Collision), Rule 8 (Action to Avoid Collision), and Rule 13 (Overtaking).
8. The Captain relied on the assumption that all contacts had been visually identified and did not monitor or verify after her initial evaluation.	• Human (4) • Permanent Crew (10) • Human Factor (143) • Situational Awareness (150) • Information Unverified	The Captain did not comply with Navigation Rules 6 (Safe Speed), Rule 7 (Risk of Collision), Rule 8 (Action to Avoid Collision), and Rule 13 (Overtaking).

	(154) • Inappropriate Standard Applied (270) *This one casual factor had two distinct paths* • Human (4) • Permanent Crew (10) • Communication (220) • Bridge Team Management (235) • Unclear Communication (236) • Inappropriate Standard Applied (270)	
9. The Captain did not alter speed of the M/V HYAK until In-Extremis of the M/Y TASYA because of lack situational awareness of the M/Y TASYA	• Human (4) • Permanent Crew (10) • Human Factor (143) • Situational Awareness (150) • Information Unverified (154) • Inappropriate Standard Applied (270)	The Captain did not comply with Navigation Rules 6 (Safe Speed), Rule 7 (Risk of Collision), Rule 8 (Action to Avoid Collision), and Rule 13 (Overtaking).
10. The Captain gave a late and non-specific rudder command without having situational awareness of the M/Y TASYA.	• Human (4) • Permanent Crew (10) • Communication (220) • Bridge Team Management (235) • Unclear Communication (236) • Inappropriate Standard Applied (270)	The Captain did not comply with good Bridge Team Management practices. The Captain should have given earlier rudder commands while the M/YTASYA was farther away. The Captain should have given distinct rudder commands with specific instructions.
11. The 2nd Mate turned the rudder to hard right approximately 4 seconds before the incident.	• Newly Assigned (11) • Human Factors • Situational Awareness (150) • Knowledge Based Decision (157) • Industry Standard (266) • Not Addressed by Standard (267)	2nd Mate Hervey understood the rudder command but applied the rudder in the wrong direction.

Conclusions:

The M/V HYAK was involved in a collision that the Board of Inquiry deems avoidable. The M/V HYAK had adequate time, equipment capability and "sea room" to avoid the collision. Weather, visibility, tides and currents were not factors in this incident. Alcohol and drugs were not factors in this incident. There were no mechanical malfunctions and all navigational equipment was functioning properly. There were no crew endurance or fatigue issues as a factor in this incident.

The M/V HYAK was in an overtaking situation with the M/Y TASYA and in accordance with the International Regulations for the Prevention of Collision at Sea 1972 (72 COLREGS), Rule 13 the M/V HYAK was required to keep out of the way of the M/Y TASYA as it was being overtaken. The Board of Inquiry also found that the Captain did not alter the speed of the M/V HYAK until In-Extremis.

The root cause of this incident was human error due to loss of situational awareness. Specifically, Captain Whaley's lack of situational awareness in combination with the Second Mate Hervey's inexperience at the helm of the M/V HYAK resulted in an In-Extremis situation. Captain Whaley lost situational awareness because she was overly reliant on radar observation and failed to monitor vessels on her intended route. In accordance with good marine practice Captain Whaley did not use all available means to ascertain the accurate location of the M/Y TASYA and take necessary actions to avoid collision prior to being in an In-Extremis situation. The Captain, when in the In-Extremis condition, gained situational awareness and took mitigative actions in an attempt to avoid a collision with the M/Y TASYA. Her actions included issuing a non-specific port rudder command that subsequently Second Mate Hervey incorrectly applied with a starboard rudder and upon recognition of the incorrect action taken by Second Mate Hervey, taking the helm from the Second Mate Hervey and putting the Engine Order Telegraph to full astern.

Recommendations:

The focus of this investigation was to identify the causal factors and root causes of this incident. The following recommendations are garnered from the lessons learned from this event. The lessons learned from this event should also be widely disseminated to further the professional development of all WSF employees. The Board of Inquiry recommends that:

1. All employees who act as a part of a navigational watch attend the WSF Bridge Team Management training program, including "closed loop communication."

2. A refresher training program for officers in charge of a navigational watch should be developed.

3. The roles, responsibilities and duties of the newly assigned Second Mates on SUPER Class vessels should be formally incorporated into policies and procedures.

4. The relative roles and responsibilities of crewmembers in the performance of the "V" maneuver should be defined.

5. Voyage Data Recorders on all WSF vessels should be considered.

6. The qualification process for Quartermaster/Helmsman duties should be reviewed.

The entire WSF system should recognize and understand that training, both formal and on-the-job training (OJT) are essential and ongoing processes and all levels of the organization play roles in training and professional development.

The Board of Inquiry recommends that this report be referred to the Director of Operations as well the Human Resources Department, for further review and consideration.

Attachments:

1. Summer 2013 Sailing Schedule
2. M/V HYAK Certificate of Inspection dated 04 March 2013
3. Crew lists for M/V HYAK – Deck and Engineering – Sept. 13, 2013
4. Tide predictions for Sept. 13, 2013
5. Tidal current predictions for Sept. 13, 2013
6. Captain Whaley's USCG Form 2692 and attached statement, submitted Sept 17, 2013
7. Captain Whaley's additional statement, submitted Sept 17, 2013
8. 2nd Mate K. Hervey's written statement to WSF, submitted Sept 13, 2013
9. Harris Electronic Service Report
10. Summer2013 Deck Schedule
11. Captain Whaley's 96-Hour Work/Rest History Worksheet
12. 2nd Mate Hervey's 96-Hour Work/Rest History Worksheet
13. Chemical and Alcohol negative test reports for operating team members
14. Captain Whaley's chartlet indicating her perception of the location of M/Y TASYA
15. 1330 to 1340 detailed timeline graph
16. Fleet Track Data for M/V HYAK for Sept. 13, 2013
17. ABS Maritime Root Cause Analysis Map
18. Applicable International Regulations for the Prevention of Collision at Sea 1972 (72 COLREGS)