

Results of the 2015
Manatee and Human
Interactions
Observational Studies,
Three Sisters Springs

Conducted by USFWS Bio-Tech Interns and Volunteers

- Official USFWS interns and volunteers conducted these surveys
- Does not represent the views of the USFWS
- Protocol created using USFWS Policy I&M Protocol Standards
- Peer-edited externally by Dr. Bob Bonde, USGS research biologist, and internally by Joyce Kleen, USFWS wildlife biologist

Three Concurrent Projects

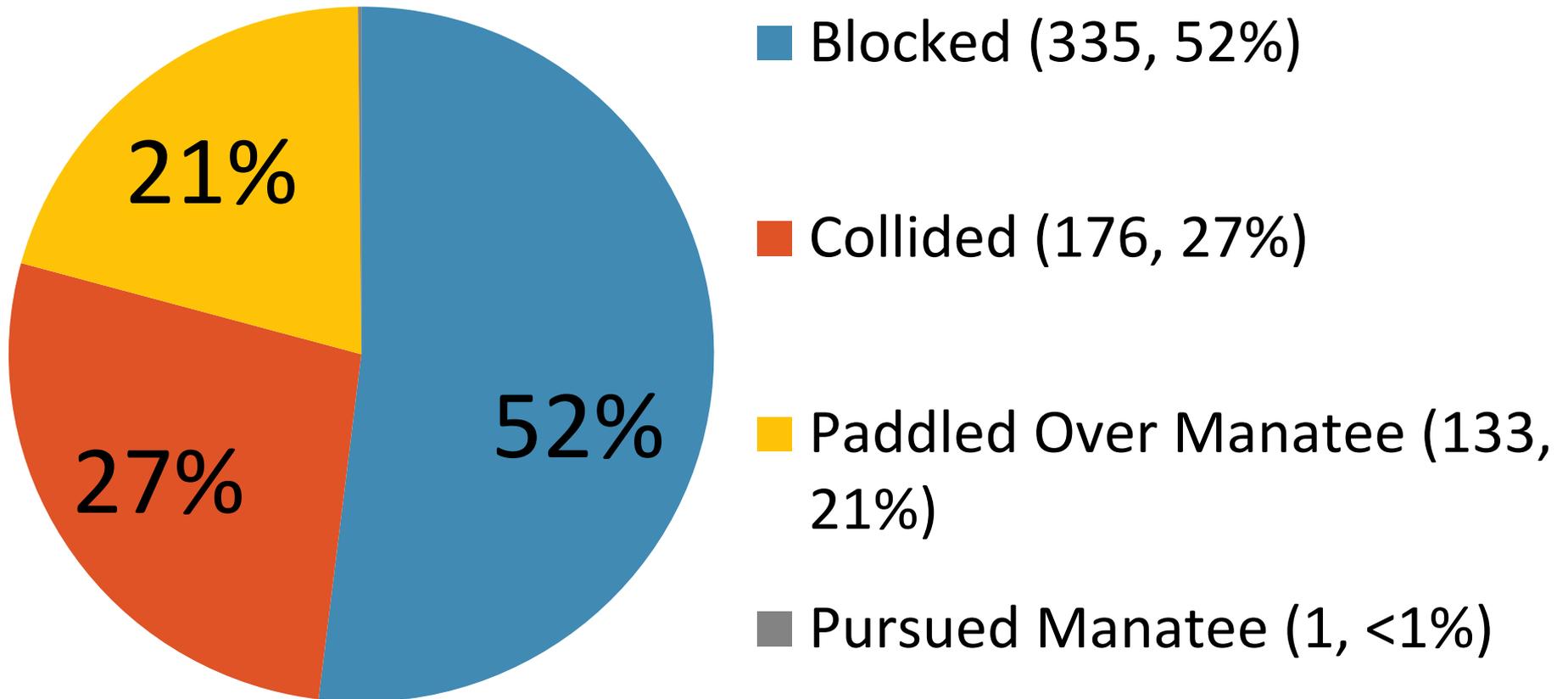
1. Spring Run Interactions
2. In-water Public Questionnaire
3. Manatee Distribution Including Cow/Calf Pairs

Spring Run Interactions

Activities in the Spring Run Defined

- Block: caused a flow impediment of manatees and/or people attempting to move into or out of the spring run
- Collision: physical contact occurred between a manatee, human, and/or paddlecraft
- Walk: human walked vertically with forward or backward movement
- Swim over a manatee: human swam over a manatee that was below the water surface
- Paddle over a manatee: human paddled their vessel over a manatee that was below the water surface
- Pursue a manatee: actively followed a manatee

Vessel Activities in the Spring Run



(Specific methods and parameters described on next slide)

Vessel Activities in the Spring Run

February 3- March 31, 2015

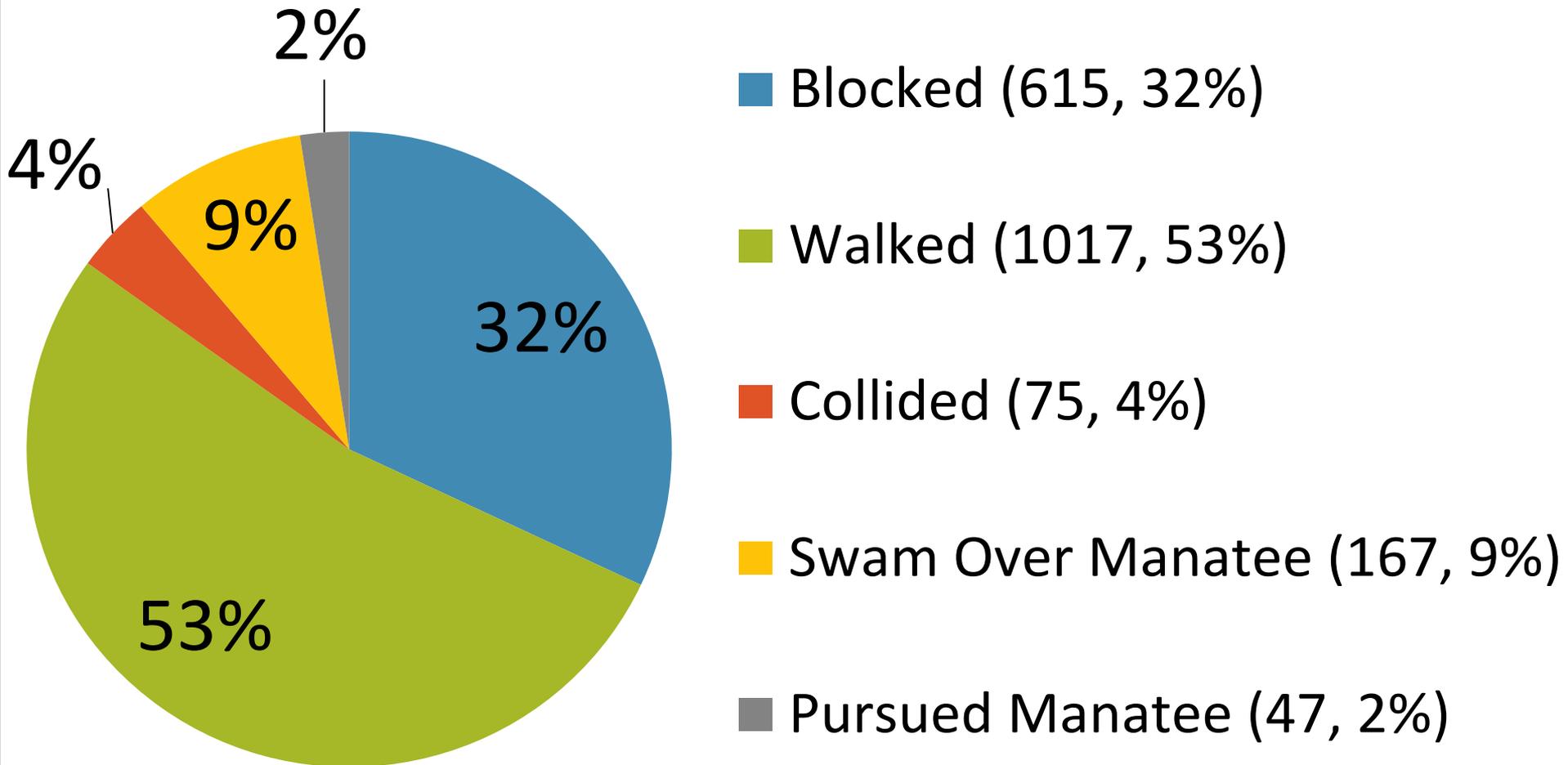
- Observations taken at spring run entrance
- Documented all blockages regardless of manatee presence; and those activities involving paddling over or pursuing a manatee
- Data collected on Tuesdays, Thursdays, Saturdays, and Sundays
- Four hour shifts that revolved around mid-tide
- Manatees move in or out of the Springs around mid-tide
- Human-manatee interactions in the spring run expected to be frequent during mid-tide
- These specific activities were recorded because of their possible affect on manatee behavior
- The Springs were closed to the public on certain days at the discretion of the USFWS based on environmental parameters (i.e. temperature, tide, manatee numbers)
- Data was collected on Tuesdays, Thursdays, Saturdays, and Sundays mainly, but if the Springs were closed on a scheduled sample day, another day in the week may have been chosen as a make-up day



Example of blocking in the spring run

Swimmer Activities in the Spring Run

February 3- March 31, 2015



(Specific methods and parameters described on next slide)

Swimmer Activities in the Spring Run

February 3- March 31, 2015

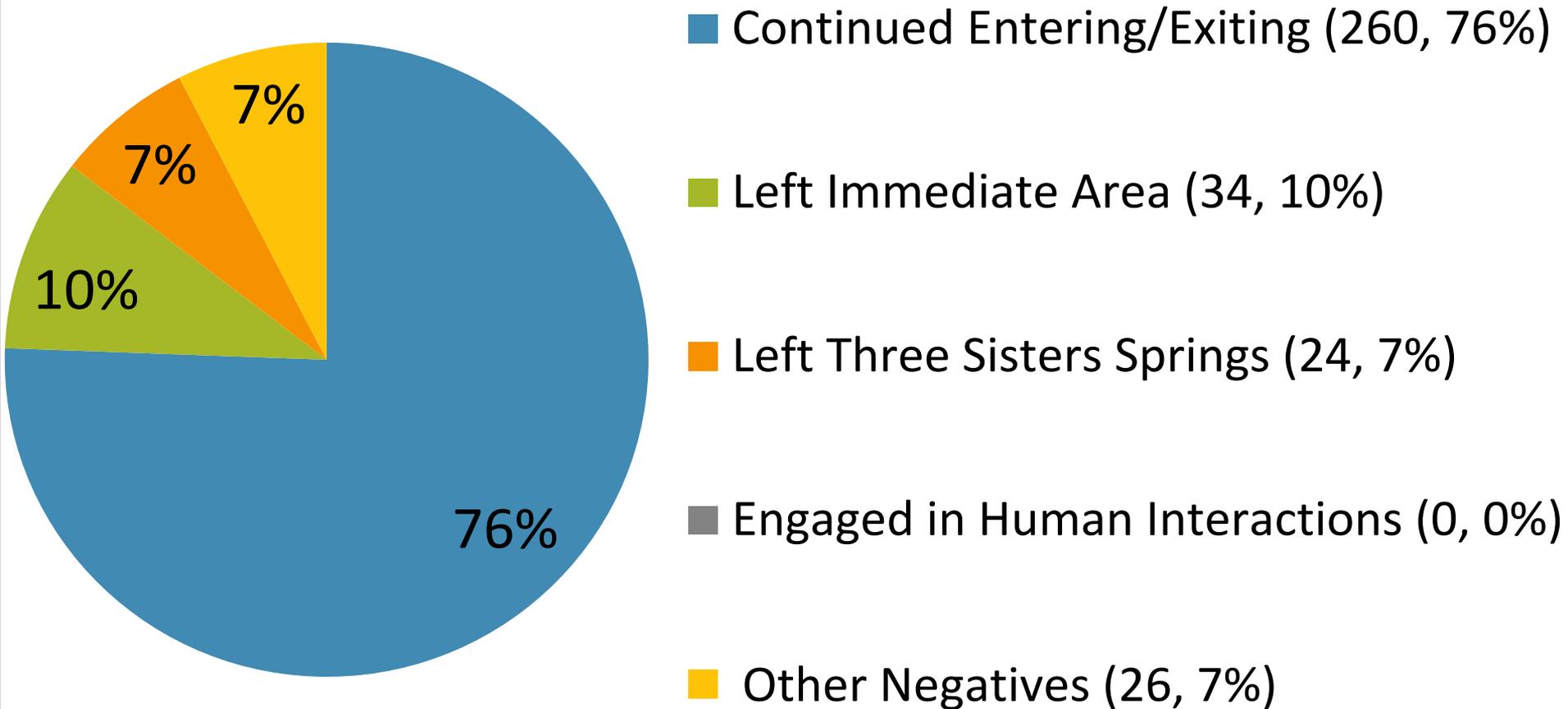
- Observations taken at spring run entrance
- Documented all blockages regardless of manatee presence; and those activities involving swimming over or pursuing a manatee
- Data collected on Tuesdays, Thursdays, Saturdays, and Sundays
- Four-hour shifts that revolved around mid-tide
- Manatees move in or out of the Springs around mid-tide
- Human-manatee interactions in the spring run expected to be frequent during mid-tide
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Example of a collision about to occur in the spring run



Manatees' Reactions to Human Interactions in the Spring Run

February 3- March 31, 2015



(Specific methods and parameters described on next two slides)

Manatees' Reactions to Human Interactions in the Spring Run

February 3- March 31, 2015

- Observations taken at spring run entrance
- Documented all manatees' reactions to human activities
- Data collected on Tuesdays, Thursdays, Saturdays, and Sundays
- Four hour shifts that revolved around mid-tide
- Manatees move in or out of the Springs around mid-tide
- Human-manatee interactions in the spring run expected to be frequent during mid-tide
- These specific activities were recorded because of their possible affect on manatee behavior
- The Springs were closed to the public on certain days at the discretion of the USFWS based on environmental parameters (i.e. temperature, tide, manatee numbers)
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Manatees' Negative Responses to Human Interactions

This is how we defined “other negatives”:

- Altered their course to get around people
- Reversed their direction of movement
- Swam away quickly from unexpected contact
- Hindered from surfacing to breathe



A manatee's view of walkers

Example of blocking, a collision, and walking in the spring run



In-Water Public Questionnaires

- Surveyor sat in kayak in main canal outside of Three Sisters Springs and verbally asked people a series of pre-determined questions
- The Springs were closed to the public on certain days at the discretion of the USFWS based on environmental parameters (i.e. temperature, tide, manatee numbers)
- Data was collected on Tuesdays, Thursdays, Saturdays, and Sundays mainly, but if the Springs were closed on a scheduled sampled day, another day in the week may have been chosen as a make-up day
- Randomly selected swimmers and paddlers including tour, rental, and private sectors
- Swimmers and paddlers had same questionnaire February 3- March 10, 2015
 - Paddlecraft ban inside Three Sisters Springs occurred on March 10; subsequently, a new questionnaire for paddlers was used March 11- March 31, 2015 (Questionnaires described on next slide)
- Recorded all refusals and responses
- Recorded the time and date of each questionnaire
- All responses were categorized

Swimmer

Questionnaire

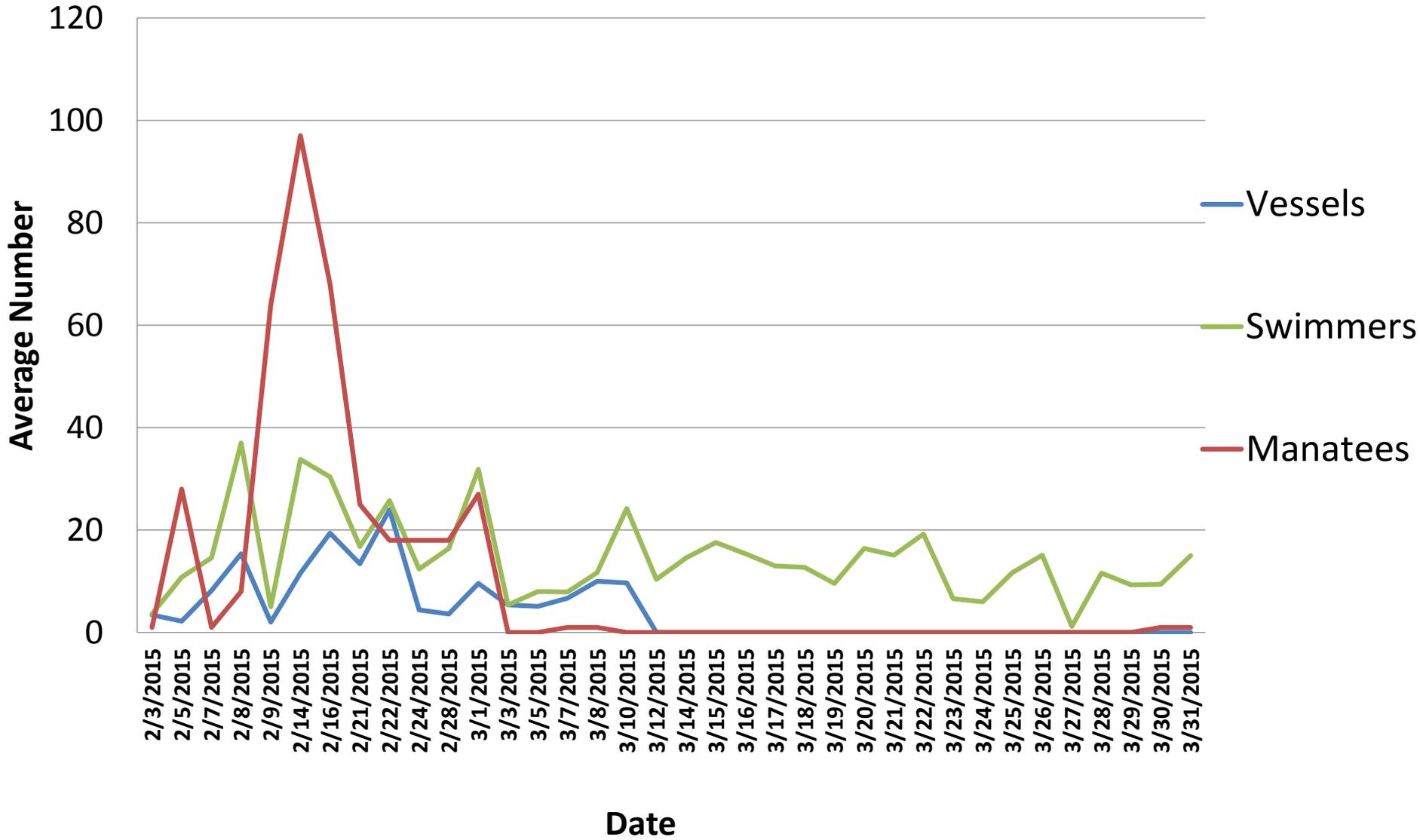
1. Local/visitor?
2. What did you like best about your experience in Three Sisters Springs?
3. What did you like least about your experience in Three Sisters Springs?
4. Do you have any suggestions to improve your experience in Three Sisters Springs?
5. Would you recommend this experience to others?

Paddler

Questionnaire

1. Local/visitor?
2. How long have you been paddling today?
3. What did you like most about your paddling experience?
4. What did you like least about your paddling experience?

Average Number of Vessels, Swimmers, and Manatees on Sample Days



(Specific methods and parameters described on next slide)

- The preceding graph shows the average number of vessels, swimmers, and manatees in Three Sisters Springs from 1:00- 4:00 P.M. on days questionnaires were being conducted
- Numbers of vessels, swimmers, and manatees in Three Sisters Springs were recorded by another observer on the boardwalk while surveyor was in the water conducting the questionnaires
- The Springs were closed to the public on certain days at the discretion of the USFWS based on environmental parameters (i.e. temperature, tide, manatee numbers)
- Data was collected on Tuesdays, Thursdays, Saturdays, and Sundays mainly, but if the Springs were closed on a scheduled sampled day, another day in the week may have been chosen as a make-up day
- Vessels, swimmers, and manatees in Three Sisters Springs were counted at 1:00, 1:30, 2:00, 2:30, 3:00, 3:30, and 4:00 P.M.
- Manatees left Three Sisters Springs for the season in the beginning of March
- Paddlecraft were banned from Three Sisters Spring as of March 10, 2015 but were permitted during a short 'grace period' to allow the public time to learn the new rule

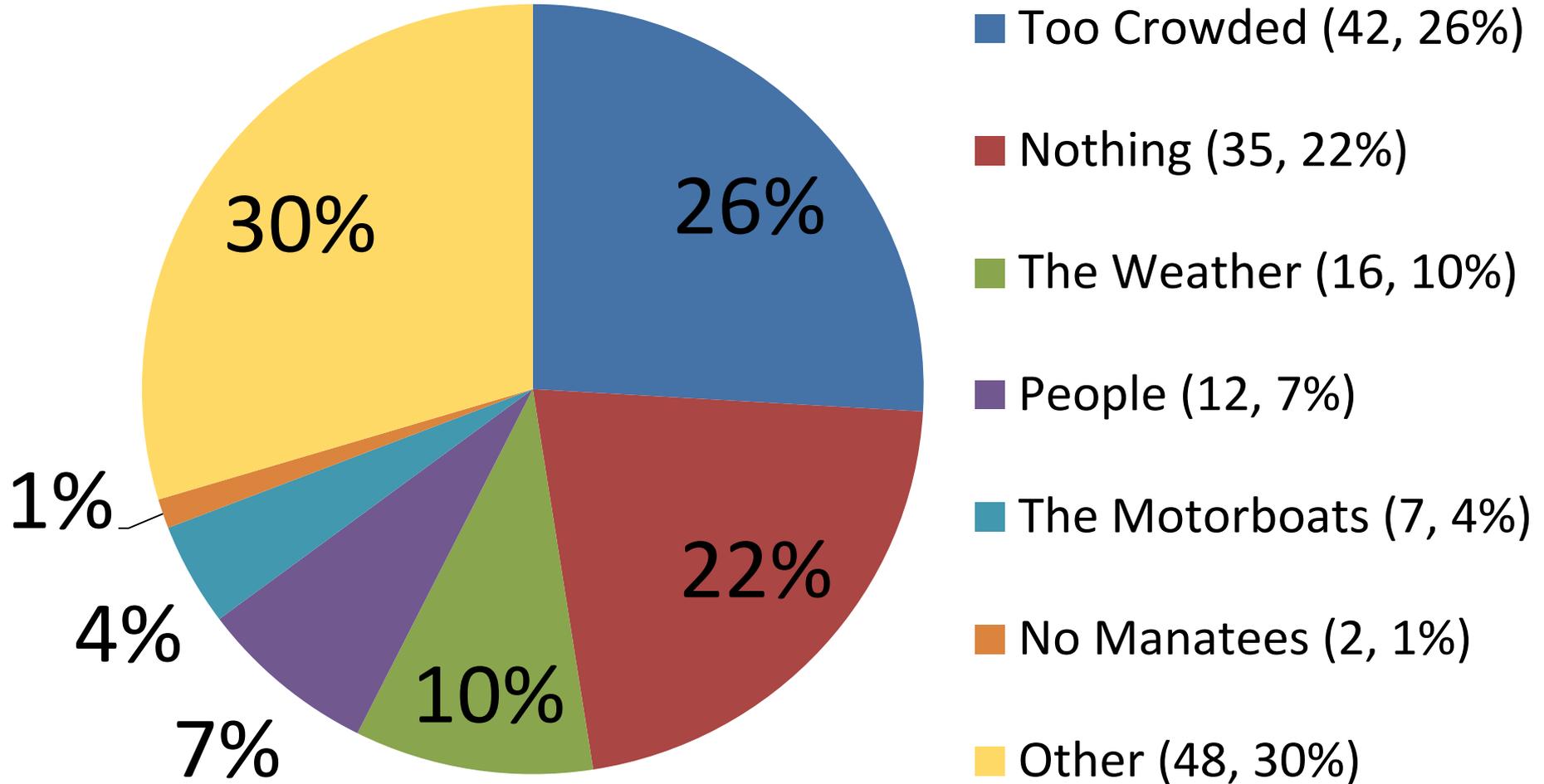
The following slides are pie charts representing the top responses to only one of the public survey questions.

The charts are divided up into two time intervals to illustrate how people felt about the changes in Three Sisters Springs.

The responses to the other questions are summarized towards the end.

Top Responses by Swimmers and Paddlers for “Liked Least About Your Experience in Three Sisters Springs”

February 3- February 28, 2015

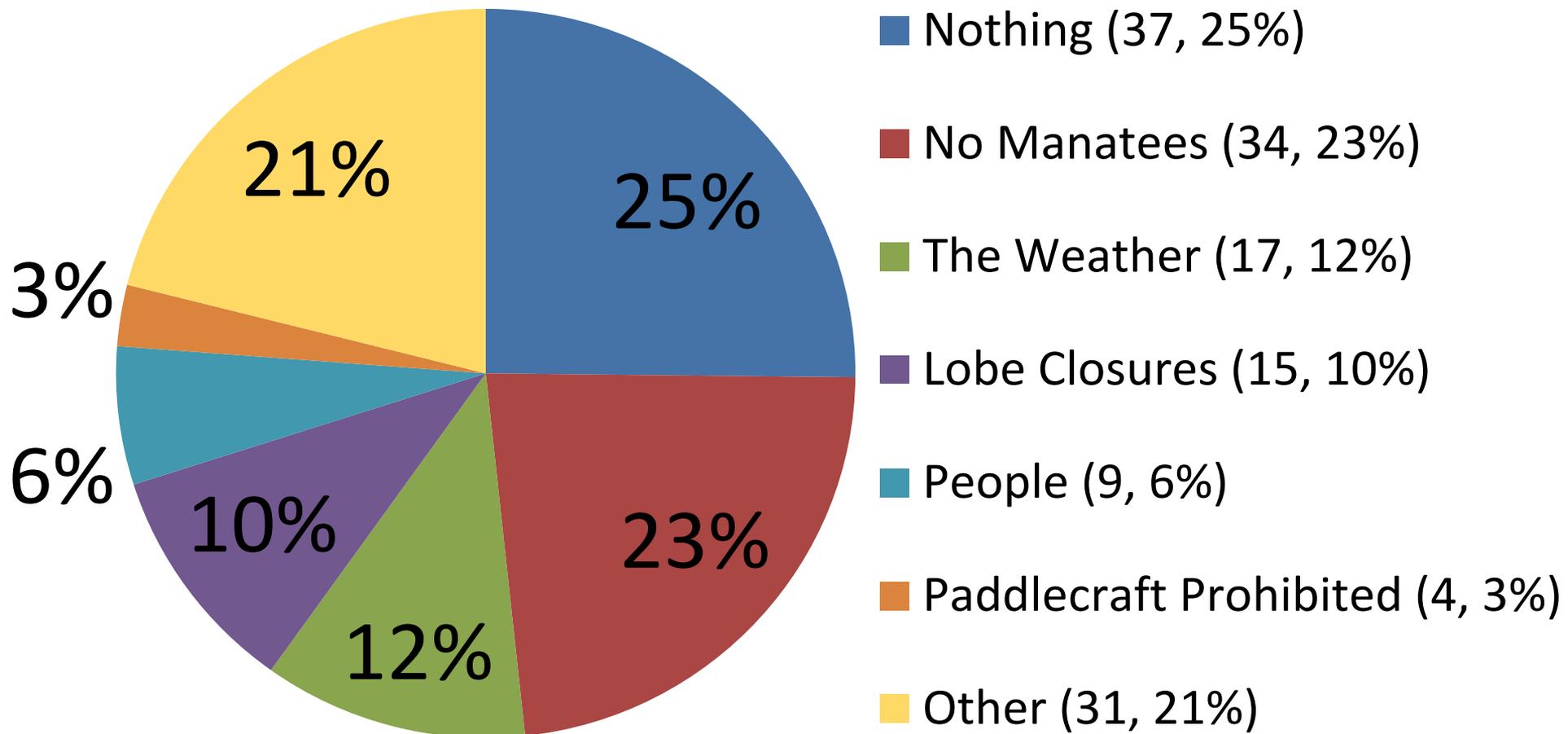


(Specific methods and parameters described on next slide)

- The preceding pie chart shows **swimmers' and paddlers'** responses to the question “What did you like least about your experience in Three Sisters Springs?” from February 3- 28, 2015
- The responses were grouped into categories:
 - “Too crowded”- the visitor replied with “it was too crowded” or expressed there were too many people in Three Sisters Springs
 - “Nothing”- the visitor replied with “nothing”; this means they didn't not like anything about their experience
 - “Weather”- the visitor replied with something about the weather (usually it was a positive remark)
 - “People”- the visitor didn't enjoy the behavior and noise level of the people in Three Sisters Springs
 - “Motorboats”- the visitor didn't enjoy the presence or volume of motorboats in the main canal outside of Three Sisters Springs
 - “No manatee”- means the visitor was disappointed with the absence of manatees
 - “Other”- there were many single responses that could not fit into a grouped category; some of the “other” responses included rule breaking, uncontrolled people, traffic jam at entrance, too many non-motorized vessels, poor water conditions, and no vegetation in Three Sisters Springs

Top Responses by Swimmers for “Liked Least About Your Experience in Three Sisters Springs”

March 11- March 31, 2015

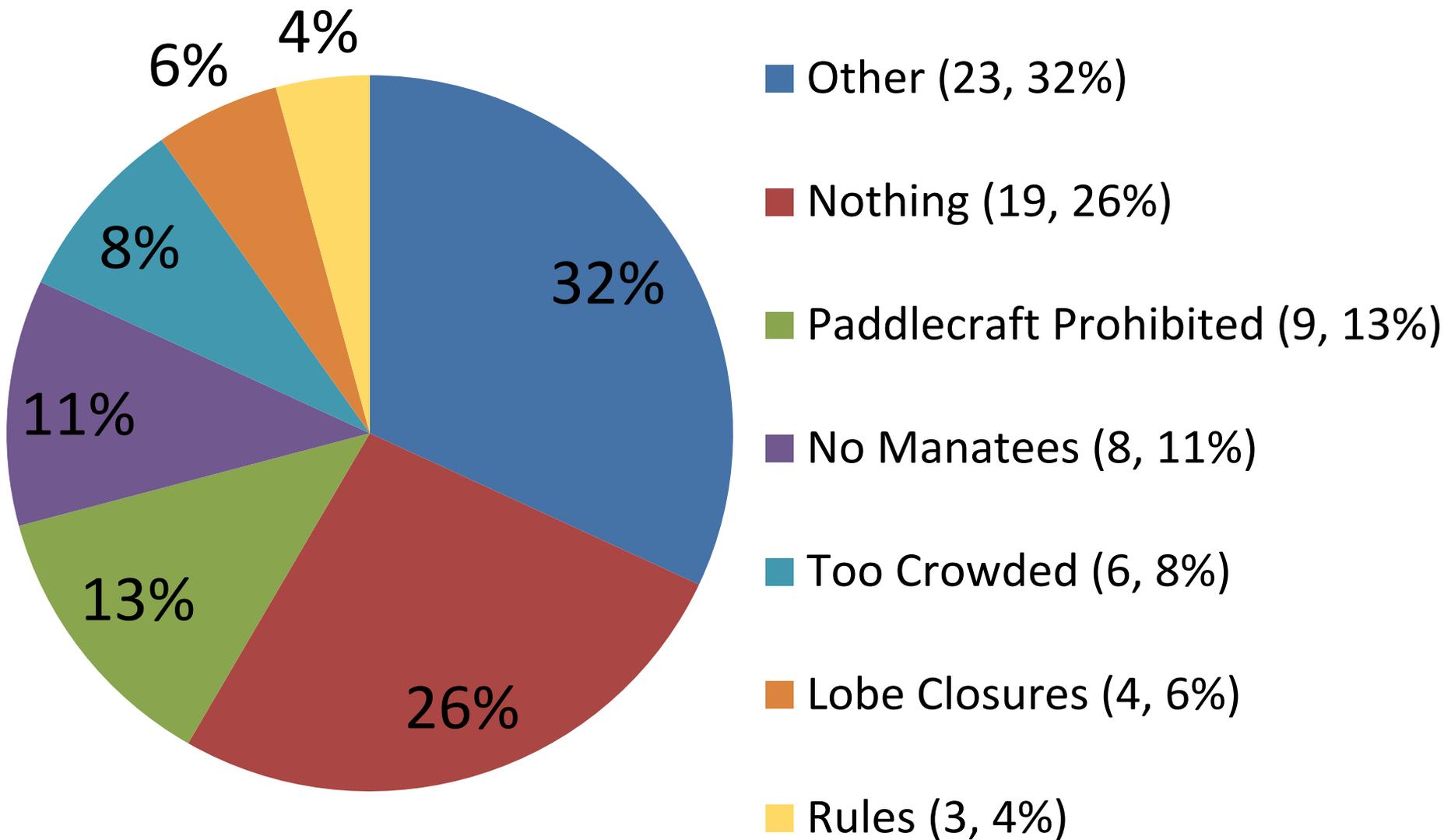


(Specific methods and parameters described on next slide)

- The preceding pie chart represents the **swimmers' responses** to “What did you like least about your experience in Three Sisters Springs?” **after the paddlecraft ban** in Three Sisters Springs from March 11- 31, 2015
- The responses were grouped into categories:
 - “Nothing”- the visitor replied with “nothing”; this means they didn't not like anything about their experience
 - “No manatee”- the visitor was disappointed with the absence of manatees
 - “Weather”- the visitor replied with something about the weather (usually it was a positive remark)
 - “Lobe closure”- the visitor didn't enjoy the presence of the new east and west lobe closures for manatee resting areas in Three Sisters Springs; the lobe closures were implemented the same time as the paddlecraft ban
 - “People”- the visitor didn't enjoy the behavior and noise level of the people in Three Sisters Springs
 - “Paddlecraft prohibited”- the visitor replied with opposition towards the paddlecraft ban inside Three Sisters Springs
 - “Other”- there were many single responses that could not fit into a grouped category; some of the “other” responses included not enough wildlife, the large rocks in the spring run, and not being able to access the land from the water

Top Responses by Paddlers for "Liked Least About Your Experience in Three Sisters Springs"

March 11- March 31, 2015



(Specific methods and parameters described on next slide)

- The preceding pie chart represents the **paddlers' responses** to “What did you like least about your paddling experience?” **after the paddlecraft ban** in Three Sisters Springs from March 11- 31, 2015
- The responses were grouped into categories:
 - “Other”- there were many single responses that could not fit into a grouped category; some of the “other” responses included not enough wildlife, the large rocks in the spring run, and not being able to access the land from the water
 - “Nothing”- the visitor replied with “nothing”; this means they didn't not like anything about their experience
 - “Paddlecraft prohibited”- the visitor replied with opposition towards the paddlecraft ban inside Three Sisters Springs
 - “No manatee”- the visitor was disappointed with the absence of manatees
 - “Too crowded”- the visitor replied with “it was too crowded” or expressed there were too many people
 - “Lobe closure”- the visitor didn't enjoy the presence of the new east and west lobe closures for manatee resting areas in Three Sisters Springs' the lobe closures were implemented the same time as the paddlecraft ban
 - “Rules”- the visitor didn't like the rules

Questionnaire Results Summarized

- Visitors surveyed responded they most liked seeing manatees
- When manatees were absent, the beauty of water is the most liked
- Most people disliked the crowding in Three Sisters Springs when responded with other than “nothing”
- After paddlecraft was prohibited, no swimmers complained of the Springs being “too crowded” anymore
- Most frequent suggestion for improving experience was Three Sisters Springs be limited and regulated
- Undisputed agreement that visitors want to share Three Sisters Springs experience with their family and friends

Manatee Distribution in Three Sisters Springs

Designated Areas for Manatee Distribution

West Lobe

West Lobe
Closure

Middle Lobe

Spring Run

East Lobe Closure

Proposed Lobe Closure
Lines for Winter 2015

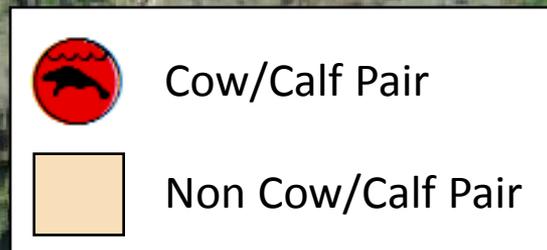


(Specific methods and parameters described on next slide)

- The preceding map shows the areas manatees were counted and recorded by location
- The designated boundary lines were marked with neon flagging on existing landmarks such as trees and signs as shown on the map
- The sampling areas were counted/mapped based on several months of intern/volunteer observations from the boardwalk
- The two proposed lobe closures were formalized by USFWS staff based both results and on years of observations
- Manatee distribution results will inform future management via lobe closures and placement

Open Days

- 24 “open” sample days
- Manatees were present 9 of these days
- 61 total cow/calf pairs
- 265 total manatees



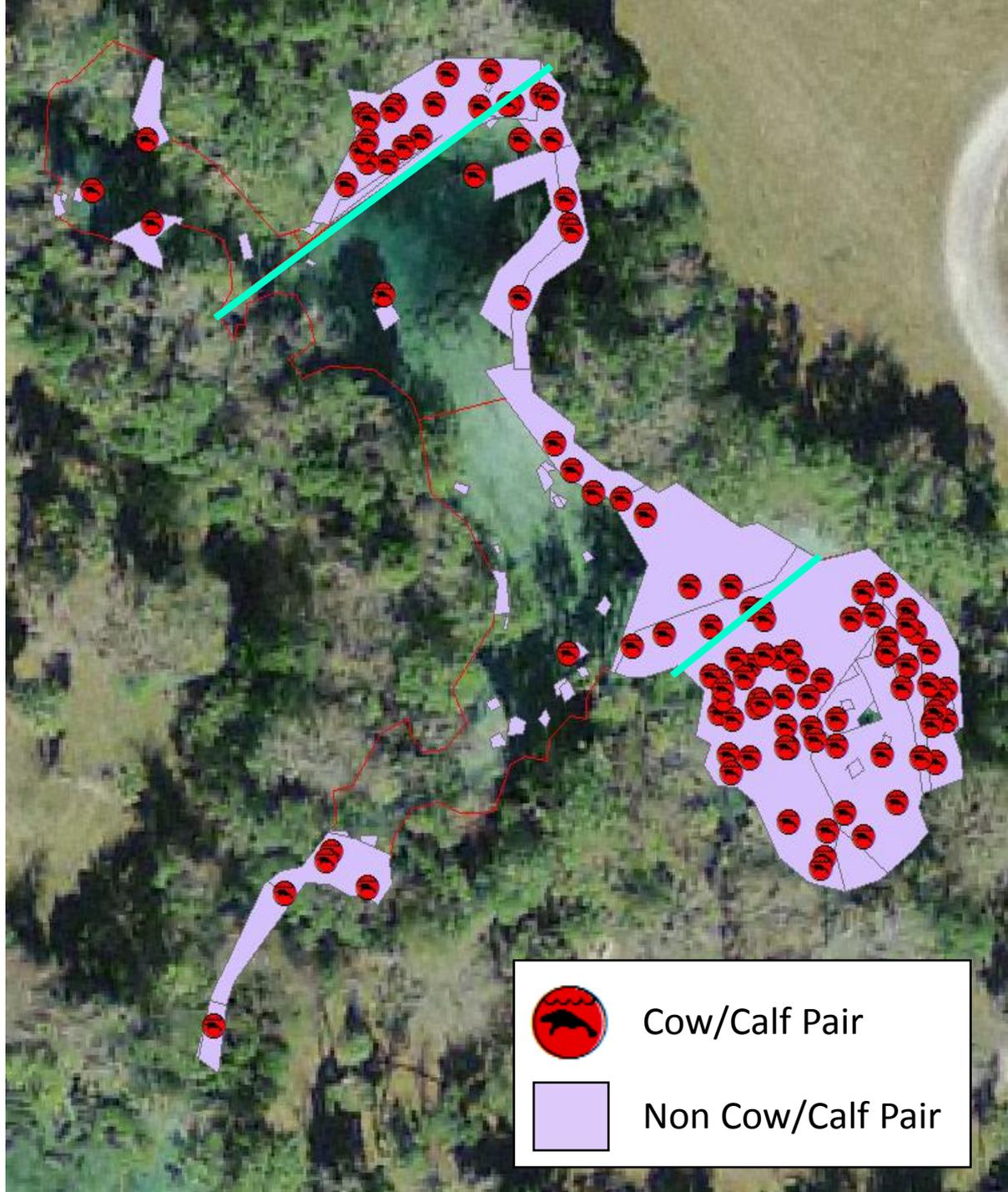
(Specific methods and parameters described on next slide)

- Observer walked around boardwalk at Three Sisters Springs, counted, and mapped where manatees were resting; cow/calf pair locations were specifically recorded
- Data collected February 7- March 31, 2015 on Tuesdays, Thursdays, Saturdays, and Sundays (with two Mondays) at **mid-tide**
- Mid-tide best suited for water clarity and significant number of manatees; manatees are usually not present at low tides; manatees are stacked and cause a great deal of bottom sediment stir up during high tide
- The Springs were closed to the public on certain days at the discretion of the USFWS based on environmental parameters (i.e. temperature, tide, manatee numbers)
- “Open days” versus “closed days” are defined by if the Springs were open or closed to the public at the pre-determined mid-tide time
- The light peach colored areas represent where manatees rested at mid-tide on open days; the red dots represent where cow/calf pairs rested
- These are all the open days “stacked” on top of each other using ArcMap 10.1
- This does not represent 265 manatees in the Springs at mid-tide on a single day; this represents 24 days (8 of which actually had manatees)
- Cow/calf pair defined as a calf estimated to be under 4 feet long and still dependent on its mother

Closed Days

- 8 “closed” sample days
- Manatees present all 8 closed days
- 106 total cow/calf pairs
- 689 total manatees

(Specific methods and parameters described on next slide)



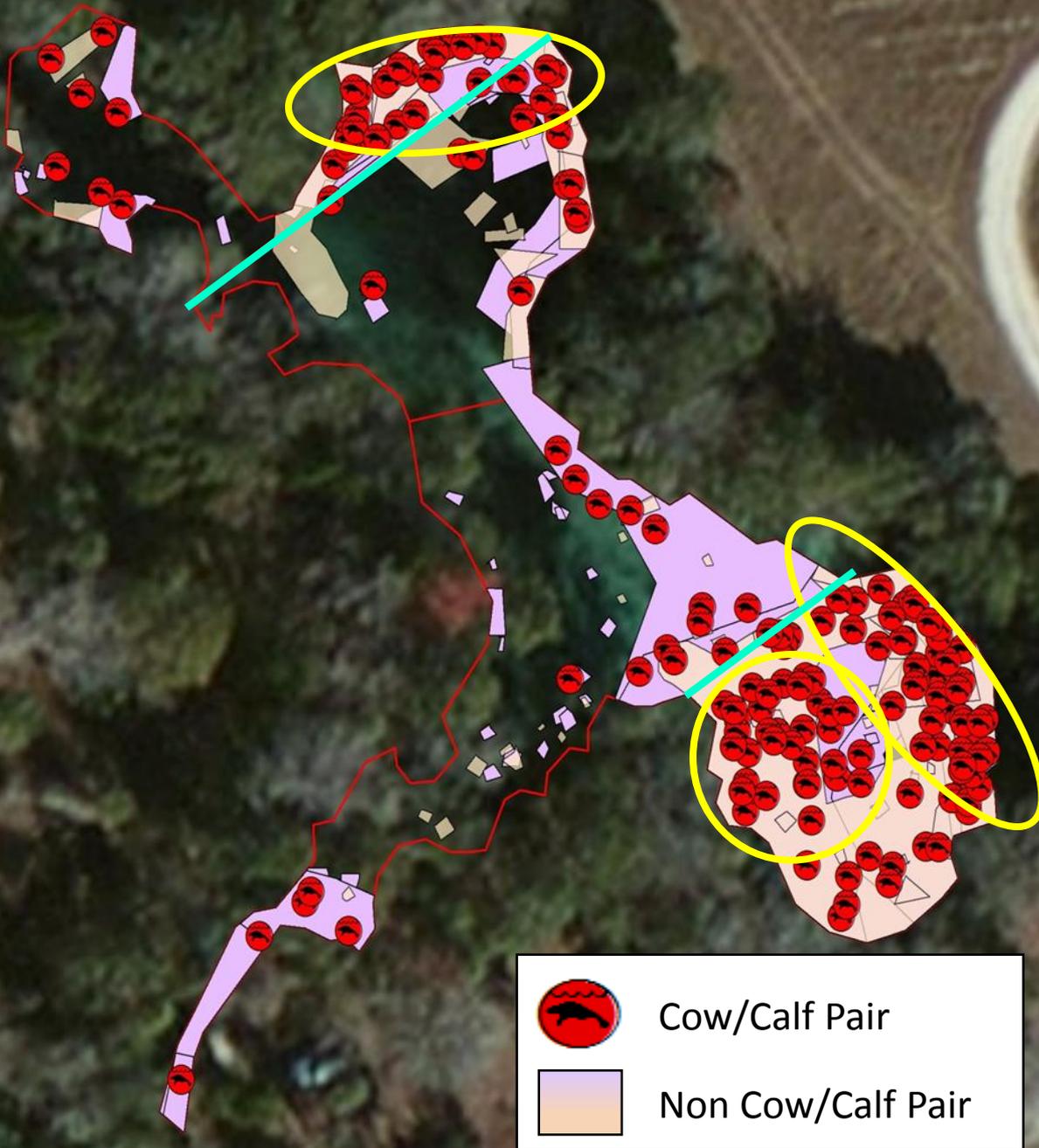
- Observer walked around boardwalk at Three Sisters Springs, counted, and drew in on maps where manatees were resting; cow/calf pair locations specifically recorded also
- Data collected February 7- March 31, 2015 on Tuesdays, Thursdays, Saturdays, and Sundays (with two Mondays) at **mid-tide**
- Mid-tide best suited for water clarity and significant number of manatees; manatees are usually not present at low tide; manatees are stacked and cause a great deal of bottom sediment stir up during high tide
- The Springs were closed to the public on certain days at the discretion of the USFWS based on environmental parameters (i.e. temperature, tide, manatee numbers)
- “Open days” versus “closed days” are defined by if the Springs were open or closed to the public at the pre-determined mid-tide time
- The light purple colored areas visually represent where manatees rested at mid-tide on closed days; the red dots represent where cow/calf pairs rested
- These are all the closed days “stacked” on top of each other using ArcMap 10.1
- Please understand, this is not representing 689 manatees in the Springs at mid-tide on a single day; this represents 8 days
- Cow/calf pair defined as a calf estimated to be under 4 feet long and still dependent on its mother

Open and Closed Days

- 32 sample days
- Manatees were present 17 of these days
- 167 total cow/calf pairs
- 954 total manatees

Most popular area for manatees and cow calf pairs alike are circled in yellow

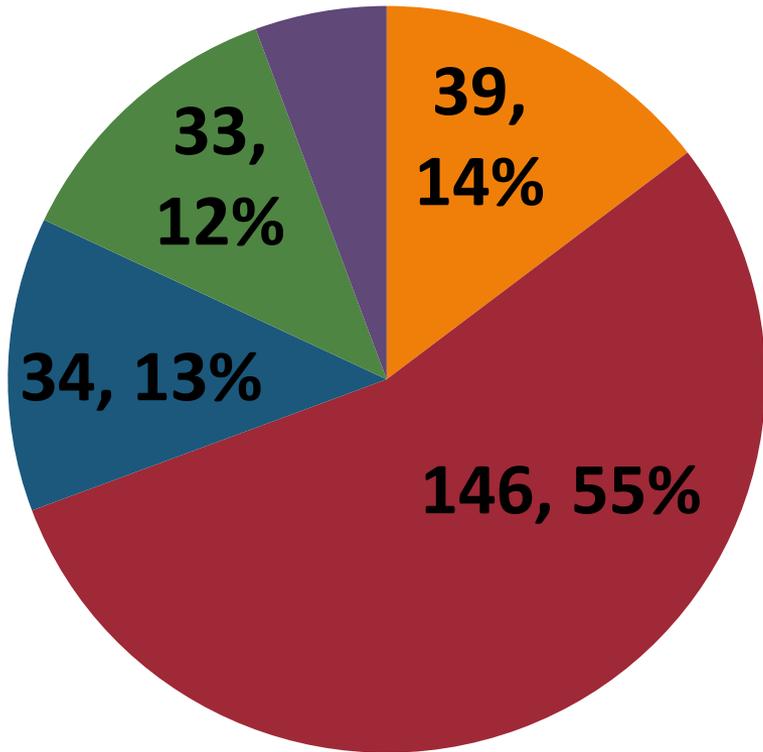
(Specific methods and parameters described on next slide)



- The preceding map is an overlay of open days versus closed days to compare manatee distribution
- Again, please understand, this is not representing 954 manatees in the Springs at mid-tide on a single day; this represents 32 sample days (17 of which manatees were present)
- The yellow circles represent the most preferred areas for manatees and cow/calf pairs alike
- Manatees and cow/calf pairs seem to prefer the east lobe closure (A.K.A. Pretty Sister) and the west lobe closure (A.K.A. the north side of Big Sister)

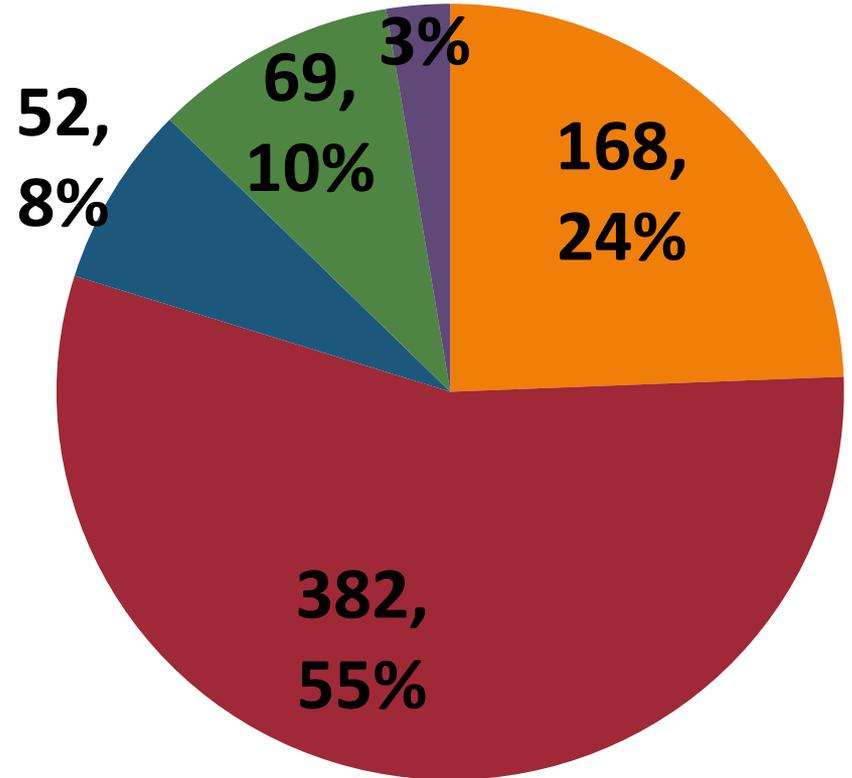
Manatee Location Preference in Three Sisters Springs on Days Open to the Public

15, 6%



Manatee Location Preference in Three Sisters Springs on Days Closed to the Public

18,



Spring Run

East Lobe Closure

Middle Lobe

West Lobe Closure

West Lobe

- The preceding pie charts numerically compare the location preference of manatees (including cow/calf pairs) open days versus closed days
- Notice a shift in the spring run usage
- Refer back to the color-coded map if needed