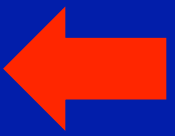
Using new science to improve MANAGEMENT DECISIONS ABOUT OLYMPIA OYSTERS

Major goals of our project

- **Do research that can improve management decisions for Olympia oysters**
- **Analyze and communicate results in ways that will be useful to you in your decision-making**

We'd like to know….

- What are the most important analyses to do with our new data? What questions do you need answered?

CONTENT 

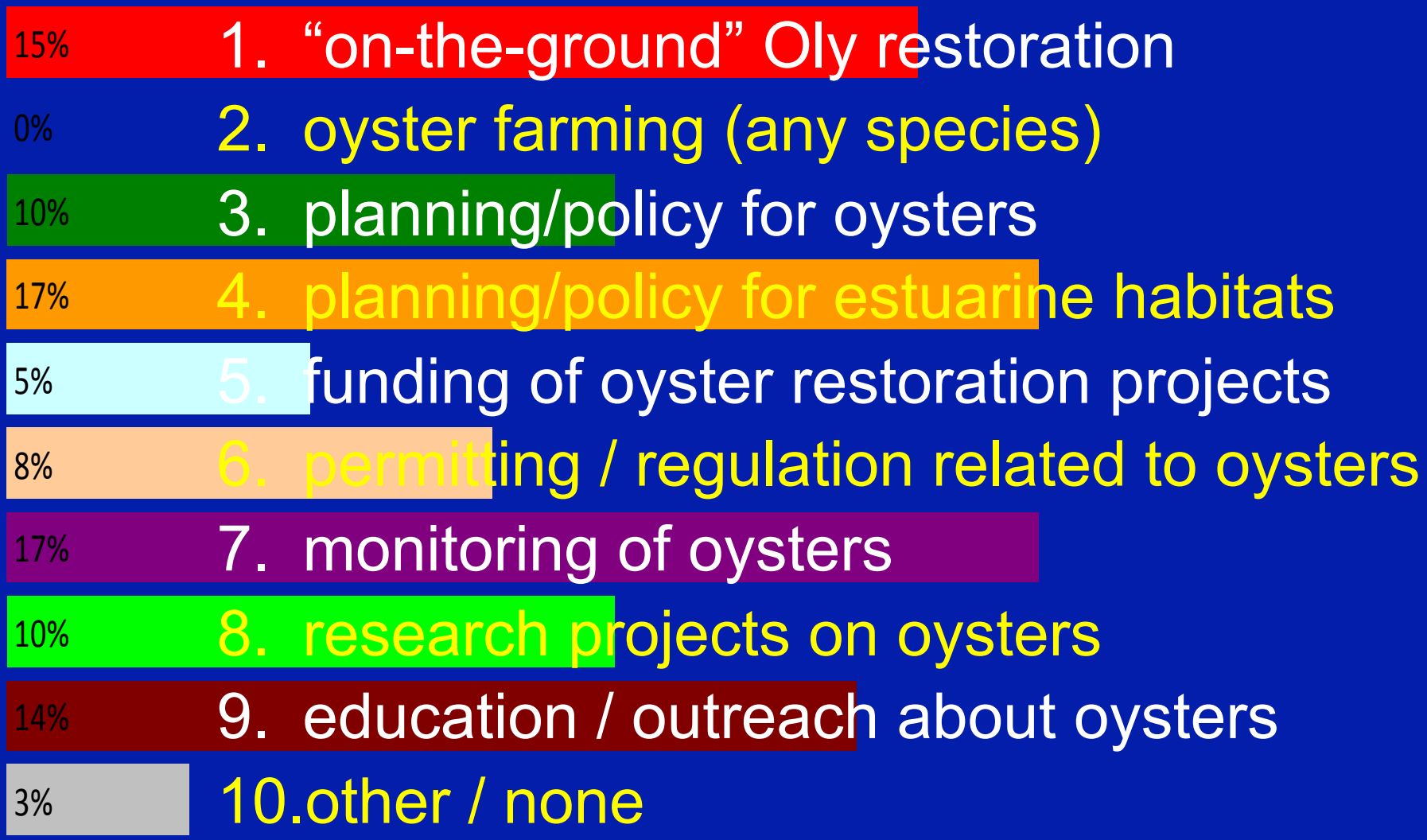
- How can we make our data easy for you to use? In what format do you prefer to receive the new information?

PACKAGING (after Rozum / tools)


Collaboration between science & management
Vote early and often!

What do YOU do with oysters?

What roles do you play with regard to Olympia oysters? Select ALL that apply



What roles do you play with regard to Oly oysters? Select ONE

16% 1. "on-the-ground" Oly restoration

0% 2. oyster farming (any species)

5% 3. planning/policy for oysters

37% 4. planning/policy for estuarine habitats

11% 5. funding of oyster restoration projects

5% 6. permitting / regulation related to oysters

0% 7. monitoring of oysters

11% 8. research projects on oysters

11% 9. education / outreach about oysters

5% 10. other / none

MANAGEMENT DECISIONS

7 questions explained & prioritized

We will explain how our new science will answer them

You will tell us:

How important is this question for improving Oly conservation/restoration?

How often do you make this decision?

MANAGEMENT DECISIONS

WHERE to conserve/restore (Q1,Q2, Q3a)

WHETHER to restore at a particular site (Q3b)

WHEN to restore (Q4)

HOW to restore (Q5, Q6, Q7)

For all of the above, our science sheds light on what is best for oysters, not on human dimensions of restoration.

Our data also do not help with WHY questions.

1) Which sites support the most sustainable existing Oly populations?

Answers from new science:

--field data show where oyster densities are high, where stressors are low

--lab data shed light on importance of different stressors

1) Which sites support the most sustainable existing Oly populations?

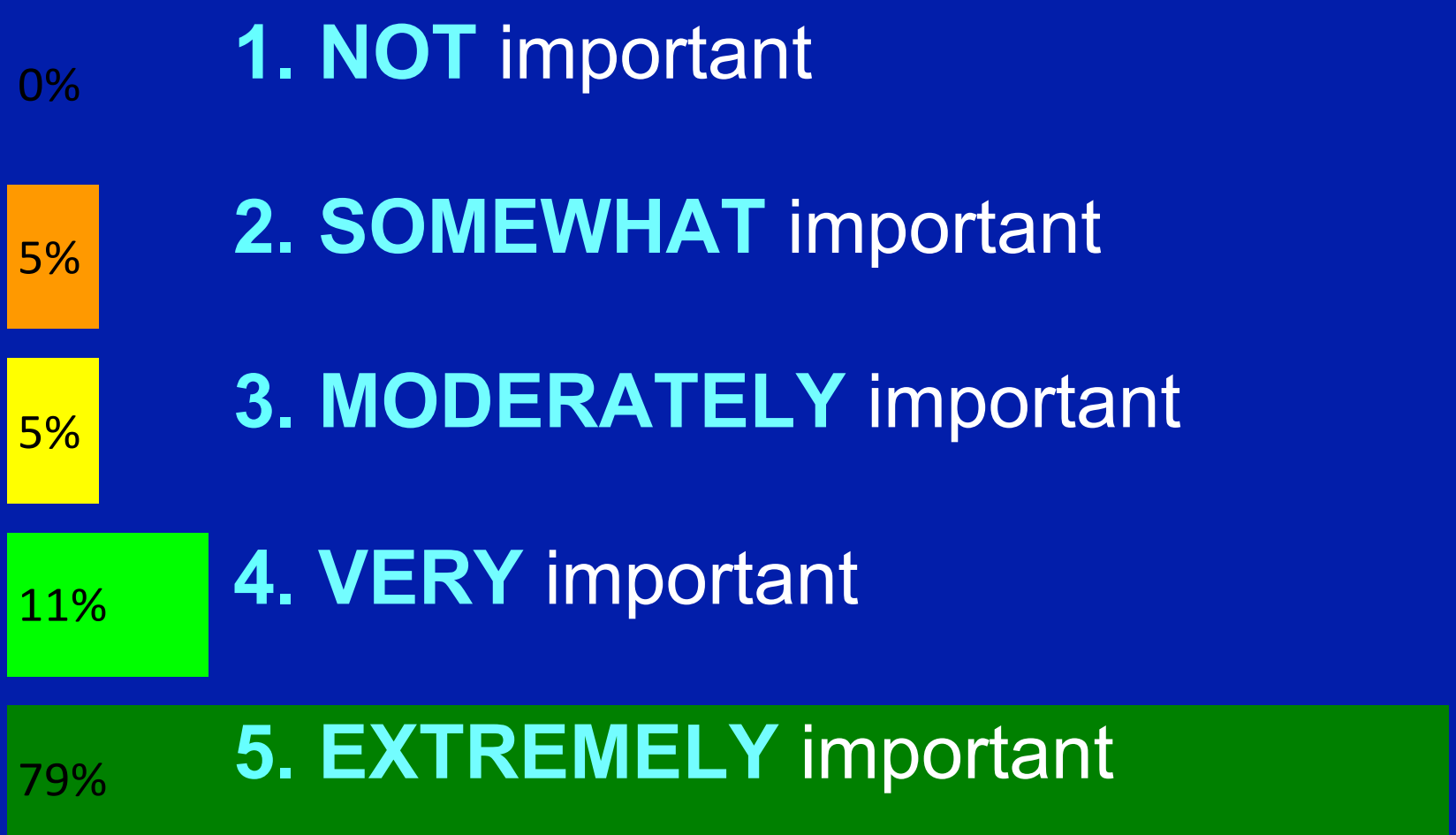
Examples of management applications:

--resource agency permitting of development project avoids disturbance to important existing areas

--regulatory agency designates special conservation area

1) *Which sites support the most sustainable existing Oly populations?*

How important is answering this question for conserving/restoring Oly oysters in this region?



1) *Which sites support the most sustainable existing Oly populations?*

How often do you make decisions related to the above question?

2) Which sites are particularly important sources of larvae for the estuary?

Answers from new science:

--data showing source of recruits will reveal which regions supply disproportionate amounts of larvae

2) Which sites are particularly important sources of larvae for the estuary?

Examples of management applications:

SAME AS FOR QUESTION 1

--resource agency permitting of development project avoids disturbance to important existing areas

--regulatory agency designates special conservation area

2) *Which sites are particularly important sources of larvae for the estuary?*

How important is answering this question for conserving/restoring Oly oysters in this region?

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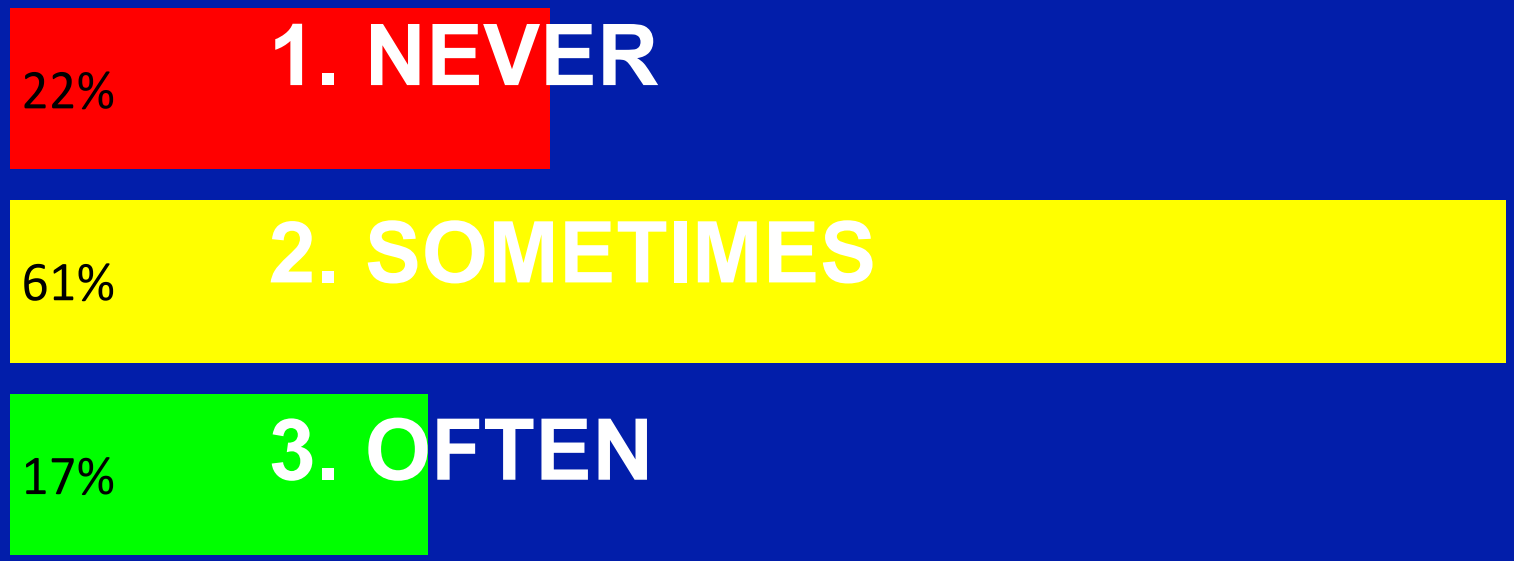
How often do you make decisions related to the above question?



3a) Which sites are best for sustainable Oly restoration projects?

(note shift from focus on CONSERVATION of existing populations to RESTORATION of new populations)

Answers from new science:

--field data show where conditions are suitable

--lab data shed light on importance of different stressors

3a) Which sites are best for sustainable Oly restoration projects?

Examples of management applications:

--funder picks the restoration proposal with greatest likelihood of long-term success

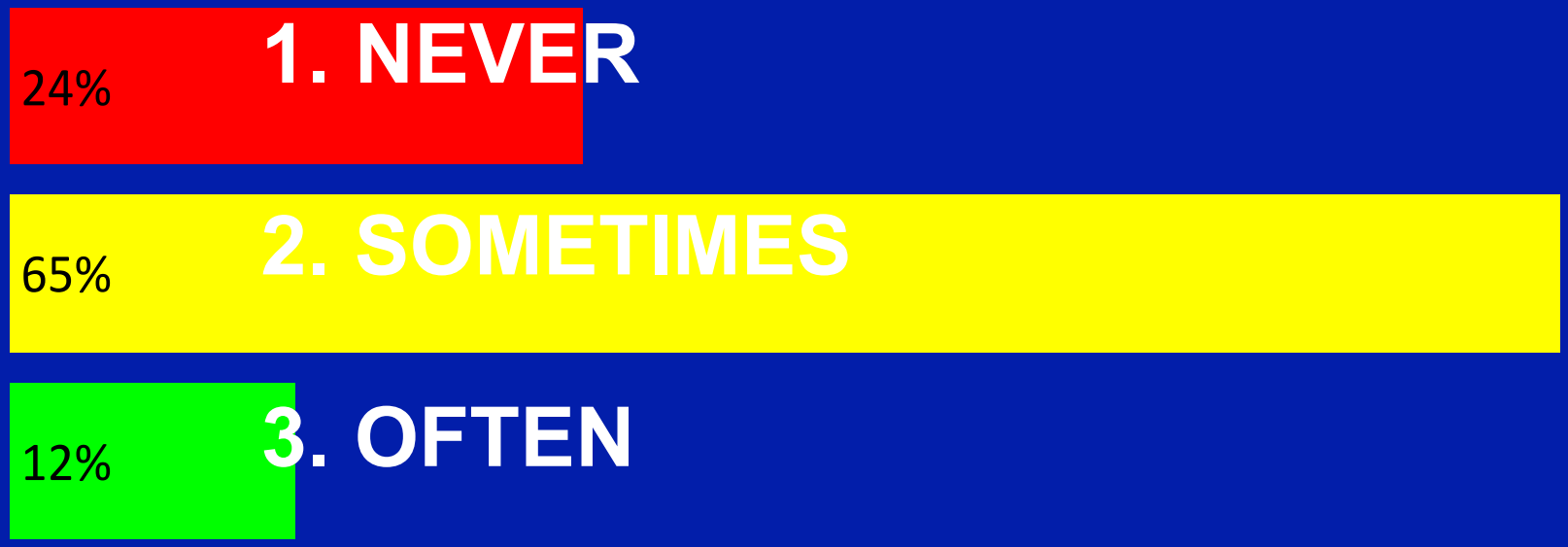
--grass-roots restoration group decides which site to propose for next restoration project

3a) Which sites are best for sustainable Oly restoration projects?

How important is answering this question for conserving/restoring Oly oysters in this region?

3a) Which sites are best for sustainable Oly restoration projects?

How often do you make decisions related to the above question?



MANAGEMENT DECISIONS

WHERE to conserve/restore (Q1,Q2, Q3a)

WHETHER to restore at a particular site (Q3b)

WHEN to restore (Q4)

HOW to restore (Q5, Q6, Q7)

3b) Is an oyster restoration project likely to be successful at site X?

Very similar to 3a, but evaluating a single site, not prioritizing among multiple sites

Answers from new science: (same as 3a)

--field data show where conditions are suitable

--lab data shed light on importance of different stressors

3b) Is an oyster restoration project likely to be successful at site X?

Examples of management applications:

--conservation landowner decides whether to invest in oyster restoration at a property they own

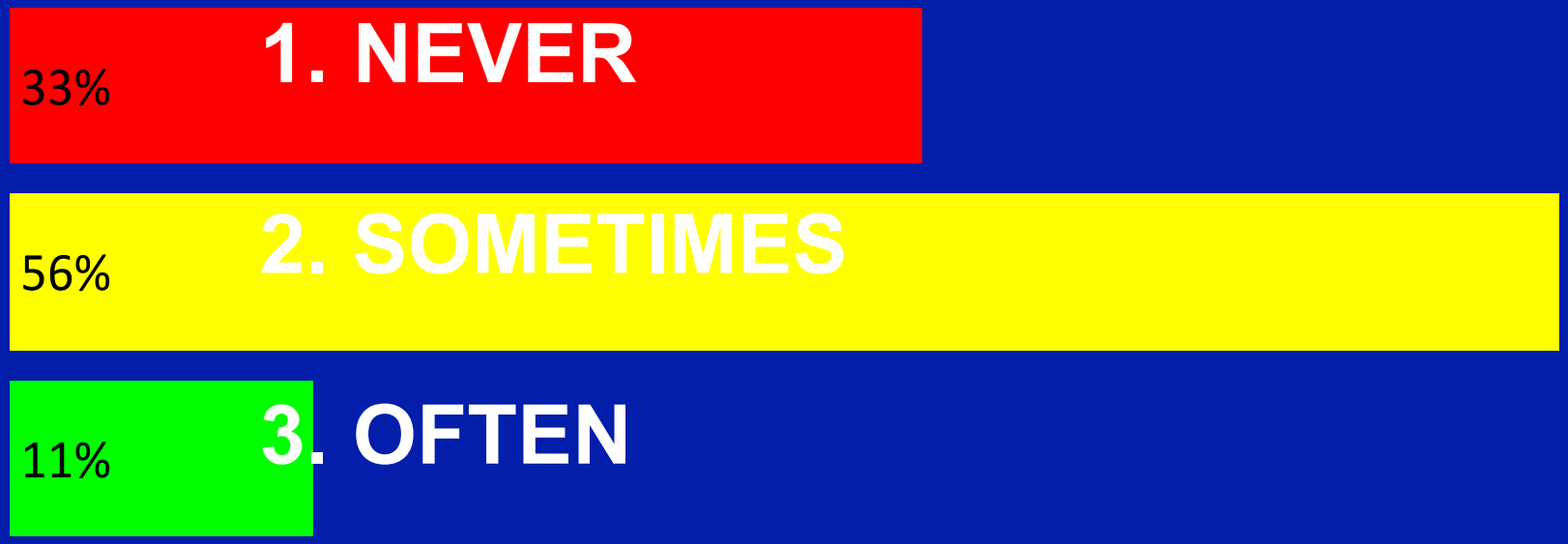
--restoration group decides whether to invest in restoration at a particular site

3b) Is an oyster restoration project likely to be successful at site X?

How important is answering this question for conserving/restoring Oly oysters in this region?

3b) Is an oyster restoration project likely to be successful at site X?

How often do you make decisions related to the above question?



MANAGEMENT DECISIONS

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HOW to restore (Q5, Q6, Q7)

4) When should oyster restoration reefs be deployed?

Answers from new science:

--field data show best times of year to maximize oyster recruitment and minimize stressors

--data can also suggest which types of years to avoid (e.g. El Niño)

4) When should oyster restoration reefs be deployed?

Examples of management applications:

--resource practitioners decide whether to deploy new reefs in May vs. July to maximize oyster success

4) *When should oyster restoration reefs be deployed?*

How important is answering this question for conserving/restoring Oly oysters in this region?

4) *When should oyster restoration reefs be deployed?*

How often do you make decisions related to the above question?

MANAGEMENT DECISIONS

WHERE to conserve/restore (Q1,Q2, Q3a)

WHETHER to restore at a particular site (Q3b)

WHEN to restore (Q4)

HOW to restore (Q5, Q6, Q7)

5) How do effects of climate-related stressors compare to those of other existing stressors?

Answers from new science:

--lab experiments compare effects of climate-related and other stressors

--field data provide opportunity to correlate oyster success to stressors across sites

5) How do effects of climate-related stressors compare to those of other existing stressors?

Examples of management applications:

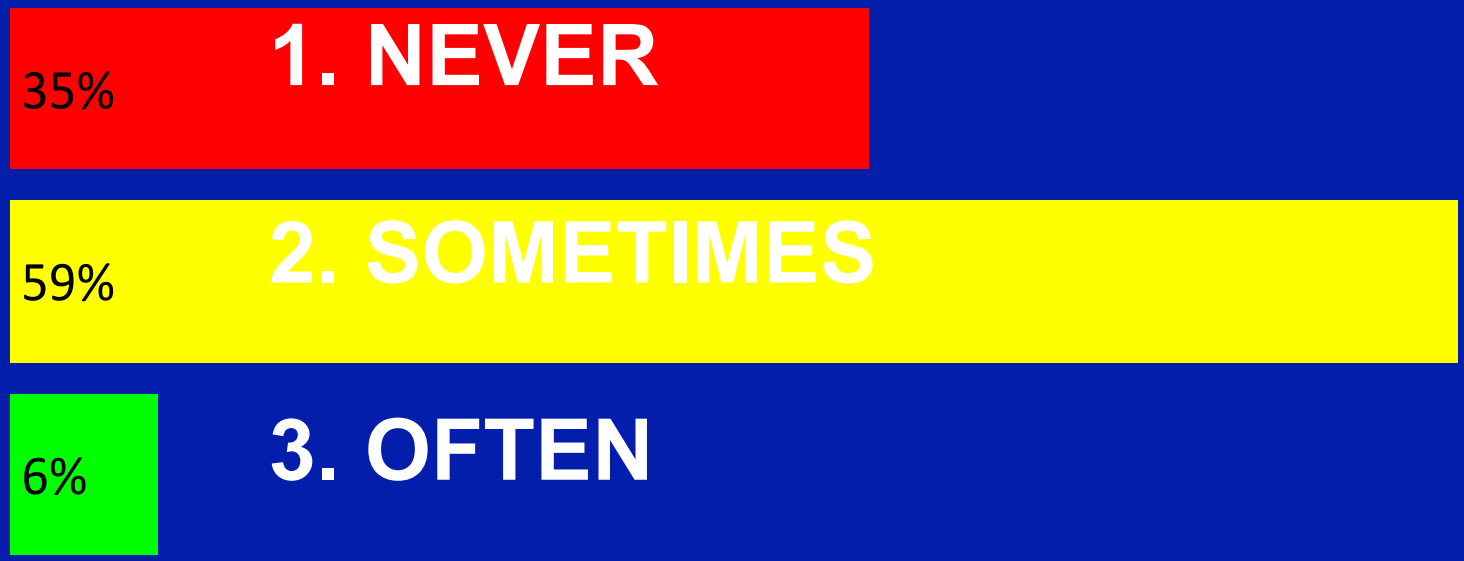
--strategic plan for estuary identifies critical stressors to focus on addressing in coming decade

5) How do effects of climate-related stressors compare to those of other existing stressors?

How important is answering this question for conserving/restoring Oly oysters in this region?

5) How do effects of climate-related stressors compare to those of other existing stressors?

How often do you make decisions related to the above question?



6) Can resilience of oysters to climate change be enhanced by decreasing other stressors?

Answers from new science:

--lab experiments examine interactions between climate-related and other stressors

--field data provide opportunity to identify such interactions through multivariate analyses

6) Can resilience of oysters to climate change be enhanced by decreasing other stressors?

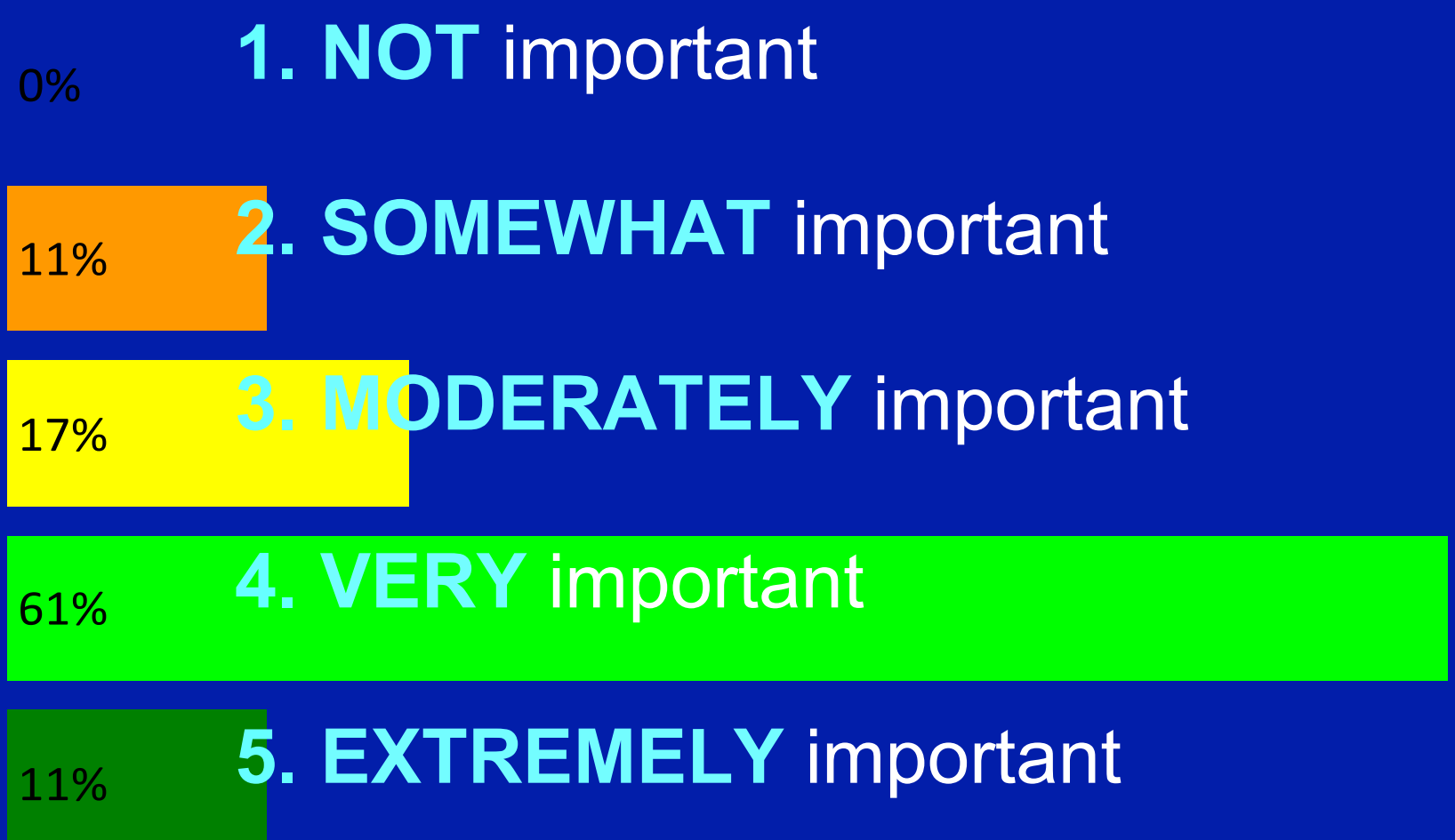
Examples of management applications:

--regulatory agencies implement stronger policy to reduce existing stressors if doing so enhances climate change resilience

--conservation landowners identify critical stressors to reduce to provide more capacity for resilience

6) Can resilience of oysters to climate change be enhanced by decreasing other stressors?

How important is answering this question for conserving/restoring Oly oysters in this region?



6) Can resilience of oysters to climate change be enhanced by decreasing other stressors?

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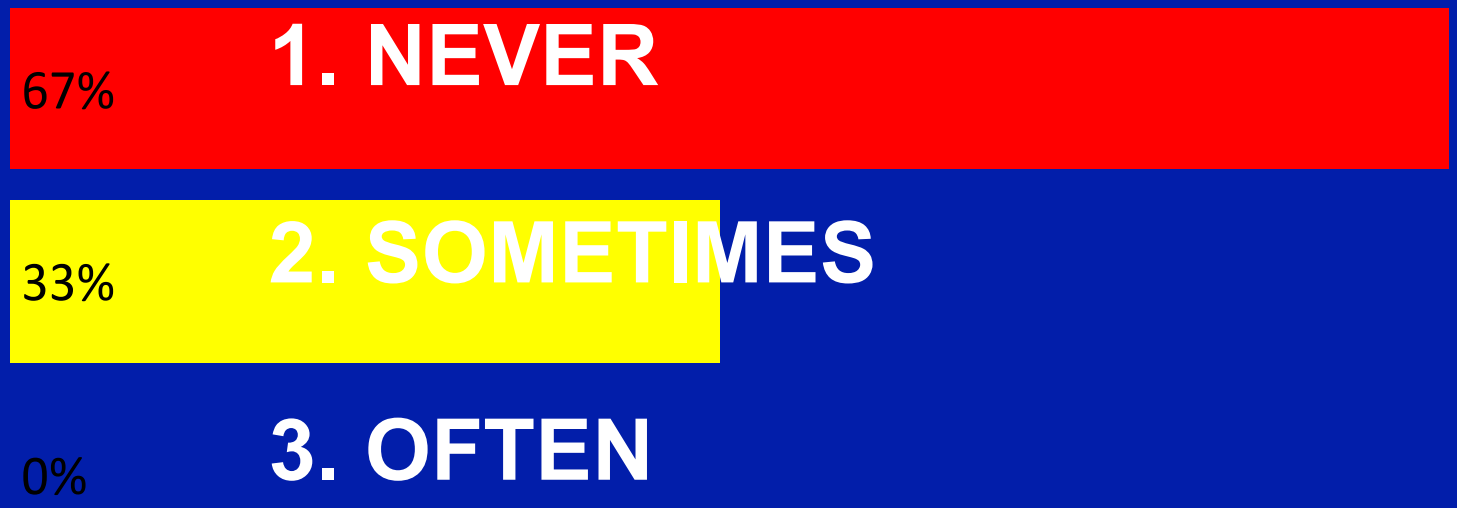


7) Do oyster reefs need to be "seeded" with oysters prior to deployment?

Answers from new science:

--field data will identify which sites have good conditions for oysters but low recruitment

7) Do oyster reefs need to be "seeded" with oysters prior to deployment?

Examples of management applications:

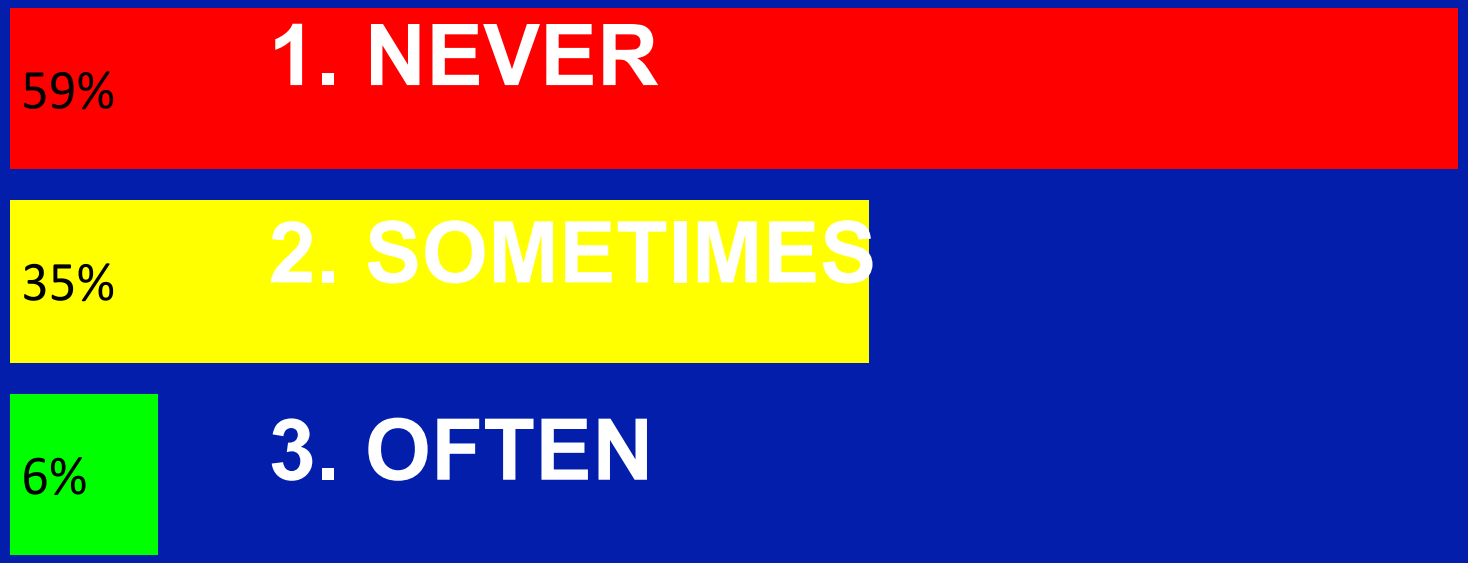
--restoration practitioners determine whether "seeding" of reefs is needed for particular sites

7) *Do oyster reefs need to be "seeded" with oysters prior to deployment?*

How important is answering this question for conserving/restoring Oly oysters in this region?

7) *Do oyster reefs need to be "seeded" with oysters prior to deployment?*

How often do you make decisions related to the above question?



DISCUSSION OF MANAGEMENT DECISIONS

--Are there any other management decisions we missed?

--Reflections about how management decisions can be improved by science that came up during the prioritization?