

STAKEHOLDER INPUT REPORT ON INVASIVE SPECIES PRIORITIES

Prepared for
The Catskill Regional Invasive
Species Partnership (CRISP)
and
The New York City Department of
Environmental Protection (DEP)

Prepared by
Bryan Dailey, PhD
bwdailey@gmail.com

March 15, 2022

Executive Summary

The Catskill Regional Invasive Species Partnership (CRISP) and the New York City Department of Environmental Protection (DEP) collaborated on a project between December 2021 and March 2022 to gather stakeholder input on invasive species priorities. A concept mapping process was utilized, which is a structured research methodology that generates insights into the perspectives and priorities that exist among stakeholders. The process provided insights into the makeup of the stakeholder group, the invasive species topics they see as priorities, how the priorities compare in terms of importance and feasibility, and who the participants feel should take the lead on implementing each priority.

The 73 participants self-categorized by role, employer / affiliation, the primary habitat they work in, and engagement with invasive species work in the region. They identified 88 priorities by completing the prompt, “One specific invasive species priority in the CRISP Region over the next five-years is...” Twenty-nine priorities were rated above average in importance and feasibility and are listed in the Results section of the report. The participants then sorted all of the statements into groups and an analysis revealed four clusters, including NYC DEP, NYS DEC, CRISP, and a collaborative cluster. The results discussed in the report and the data included in the Appendices can be used as a consensus-driven pipeline of prioritized projects for each organization and their collaborators.

Table of Contents

List of Appendices	4
List of Figures	5
List of Tables	6
Background.....	7
Schedule	7
Activities and Participation	8
Results	13
Discussion.....	21
References.....	23

List of Appendices

- Appendix A. Invitation Emails..... 24
- Appendix B. Statements Sorted by Statement Number 26
- Appendix C. Statements Sorted by Combined Rating Mean 29
- Appendix D. Priority Matrix (DEP Participants Only)..... 33
- Appendix E. Statements Sorted by Combined Rating Mean (DEP Participants Only) .. 34
- Appendix F. Statements Sorted by Organization Cluster and Combined Rating Mean 38

List of Figures

Figure 1. Primary Role	9
Figure 2. Primary Employer / Affiliation	10
Figure 3. Primary habitat.....	11
Figure 4. Involvement with CRISP and/or Invasive Species Management in the Region	12
Figure 5. Priority Matrix	13
Figure 6. Point Map	16
Figure 7. Cluster Map.....	17
Figure 8. Cluster Rating Map, Importance.....	18
Figure 9. Cluster Rating Map, Feasibility.....	19
Figure 10. Parallel Coordinates, Importance.....	20
Figure 11. Parallel Coordinates, Feasibility	21

List of Tables

Table 1. Schedule..... 7

Table 2. Rating Scores, Sorted by Combined Mean..... 14

Table 3. Rating Variance..... 15

Table 4. Lead Organizations and Collaborators..... 17

Background

In the fall of 2021, the Catskill Regional Invasive Species Partnership (CRISP) and the New York City Department of Environmental Protection (DEP) sought to understand stakeholder perspectives on invasive species management priorities in their region. A grant from the DEP was awarded to employ a concept mapping methodology.

Concept mapping enables participants to participate in a convenient, confidential, structured, and timebound process (Trochim, 1989b). It has been used in many fields to assist with group decision making and was recently employed by the New York Invasive Species Research Institute for a similar purpose with their New York State stakeholders. To facilitate the process, a software license was purchased for access to a platform designed for participant input and analysis (Concept Systems, 2022).

The concept mapping process involves significant planning, including the development of a focus prompt, demographic questions, rating criteria, and for this project, an alternate sorting methodology. The process then includes several stakeholder activities, including demographic questions, idea generation, rating, and sorting.

Schedule

The CRISP-DEP process followed the schedule below in Table 1. Multiple extensions were offered to participants, initially to complete the ratings and then an additional period at the end for all activities.

Table 1. Schedule

Activity	Start	End
Discussions	May 26	November 16, 2021
Planning	November 16	December 2, 2021
Participant Activities		
Idea Generation	December 3	December 31, 2021
Importance Rating	January 10	January 28, 2022
Feasibility Rating	January 19	January 28, 2022
Sorting	February 1	February 7, 2022
Extension	February 9	February 12, 2002
Analysis & reporting	February 14	March 7, 2022

Activities and Participation

Participation was open to all CRISP and DEP stakeholders, and invitations were sent by email to a CRISP Mailchimp list with 143 addresses, a CRISP listserv with 287 addresses, and individual invitations. There was some overlap between the two CRISP lists, and recipients were encouraged to forward the invitation to those who may not have received it. Examples of the emailed invitations are in Appendix A.

The first activity of brainstorming generated 161 ideas by stakeholders completing the prompt, “One specific invasive species priority in the CRISP Region over the next five-years is...” These ideas were submitted through 84 contributions, from a likely smaller number of participants who returned more than once. We do not know the exact number of participants because submitting ideas in this activity was done anonymously.

The 161 ideas were reduced and synthesized to eliminate redundancies and combine similar ideas, resulting in a list of 88 priorities. The people involved in this process were the project owners, John Thompson of CRISP, Meredith Taylor of DEP, and the consultant, Bryan Dailey.

Redundancy in a statement set can be considered as an indication that the ideas represent the breadth of a topic. The full list of statements is included in Appendix B. Some common themes included early detection, rapid response, education, and outreach. There were also several specific species that were submitted multiple times, including beech leaf, jumping worms, spotted lantern fly, and woolly adelgid.

Subsequent activities required registration, and 73 stakeholders responded to participant questions, importance rating, feasibility rating, and sorting. Participant questions were asked to provide a better understanding of the stakeholders as a group and to allow the results to be segmented according to sub-groups.

There were surprisingly 8 participants who completed the questions but did not participate in the rating or sorting activity. Their responses were included in the participant descriptions below in order to provide the most complete description possible of the stakeholder group, although it means that these descriptions may not strictly describe the slightly smaller group of participants who provided input in the activities.

The four participant questions asked for primary role, primary employer/affiliation, primary habitat in which they work, and involvement with CRISP and/or invasive species management in the region. It was hoped that the menu of responses would describe the participants, but due to the variety of potential stakeholders who were expected to participate, an “Other” response was included for the first three questions with an open text field.

The possible responses to primary role included Landowner, Land manager, Researcher, Educator, Contractor (landscaper/forester), Volunteer, and Other. The

most common responses were Land managers (37%) and Researchers (19.2%). The “Other” option was selected surprisingly often (20.5%) and was most often an administrator or manager type of role. The breakdown is shown in the figure below.

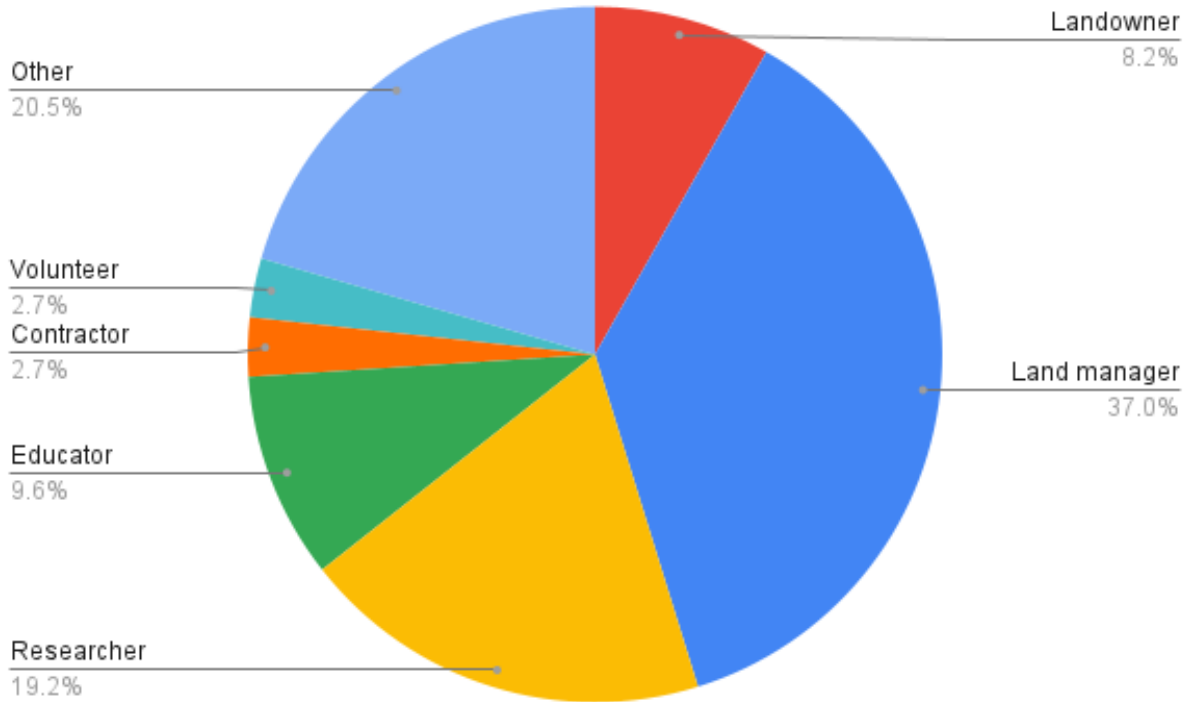


Figure 1. Primary Role

Possible responses to the second question of primary employer or affiliation included NYC DEP, PRISM, Local entity (CCE, SWCD, other municipal office, non-profit), NYS/Federal Agencies, University/College, and Other. The most common responses were NYC DEP (40.9%) and Local Entity (15.5%). Again, the “Other” response was selected frequently, and the most common responses given were retirement and self-employment. The breakdown is shown in the figure below.

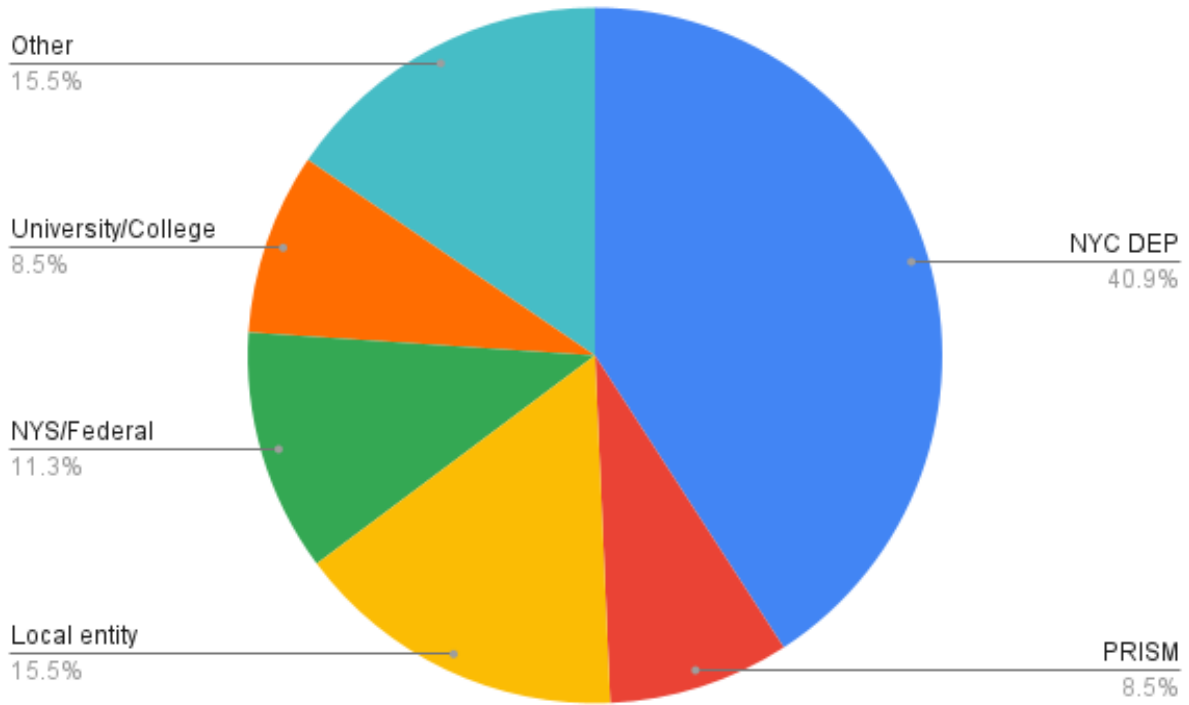


Figure 2. Primary Employer / Affiliation

Possible responses to the third question included Aquatic, Riparian, Wetland, Upland/Terrestrial, and Other. The most common responses were Upland/Terrestrial (50%) and Aquatic (19.4%). The “Other” category included 13.9% of participants and the most common reason was that they wanted to include multiple habitats. The full breakdown is shown in the figure below.

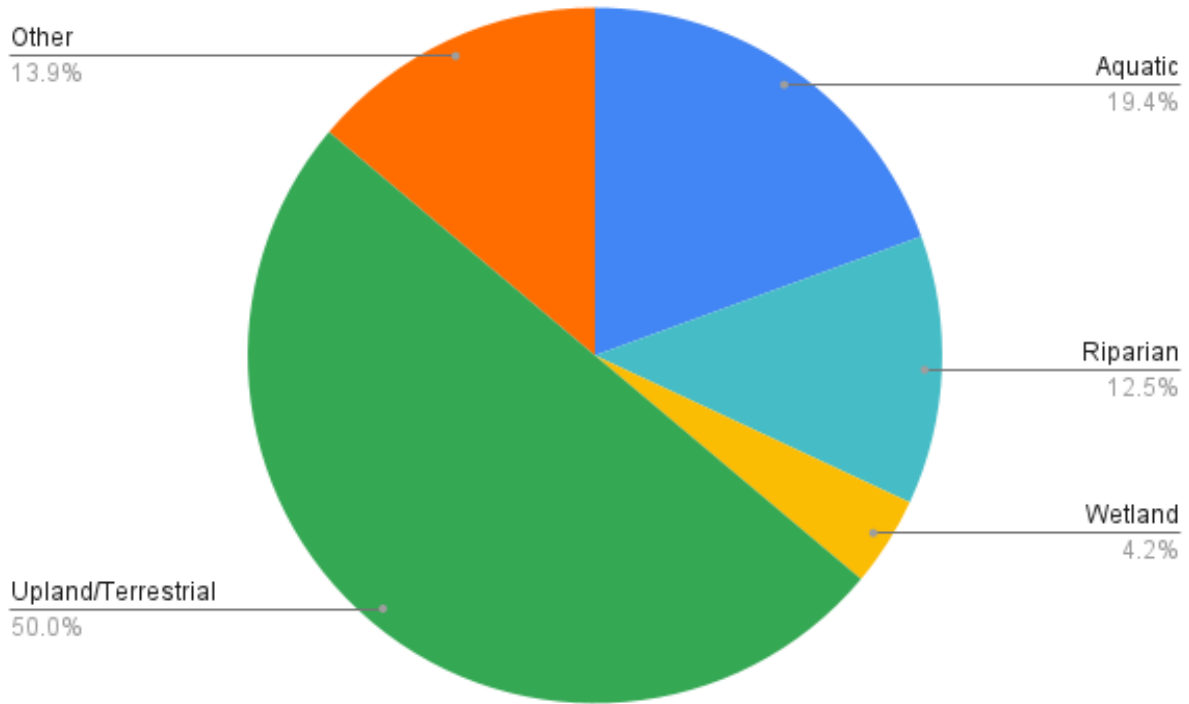


Figure 3. Primary habitat

Responses to the fourth question, of involvement with invasive species work, included Very involved, Somewhat, and Not at all. The most common response was Somewhat (67.1%), followed by Very Involved (19.2%). Participants who were not at all involved was 13.7%. The full breakdown of the results is shown in the figure below.

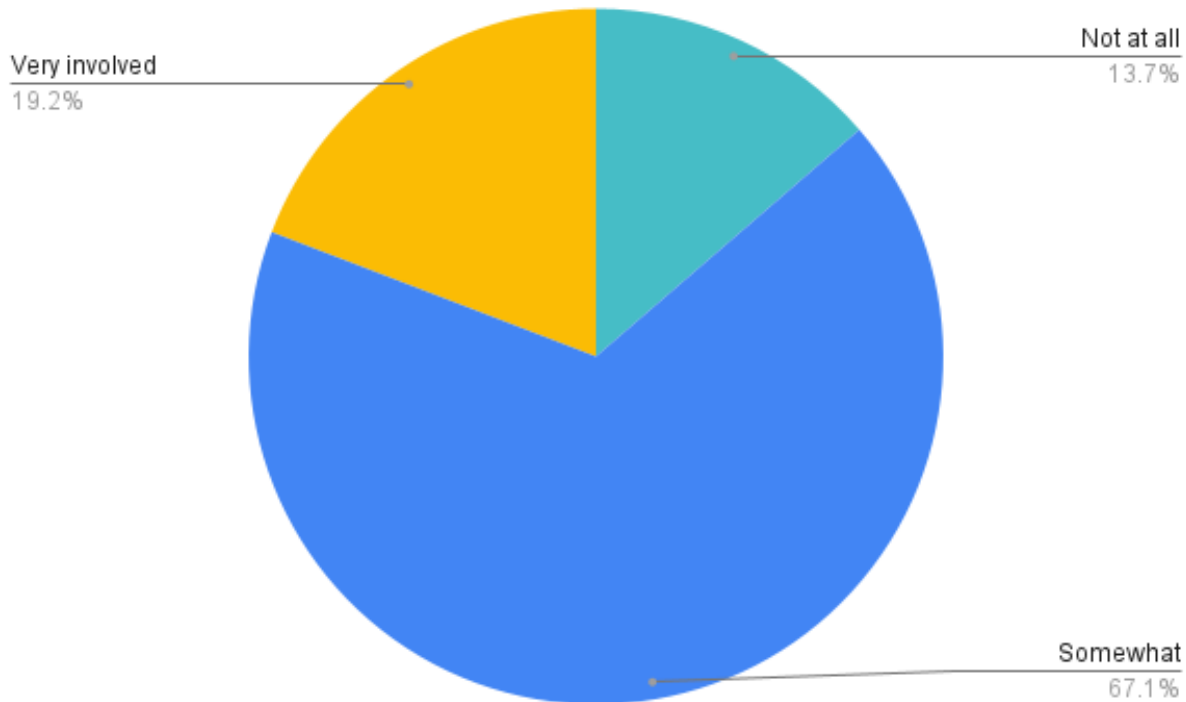


Figure 4. Involvement with CRISP and/or Invasive Species Management in the Region

The two rating activities had solid participation, with 61 participants for the importance rating and 31 participants for the feasibility rating. The concept mapping process would normally schedule the rating activity after the sorting activity. Sorting often has a lower number of participants because it is more complicated and more time intensive than the rating activities. The prioritization was especially important for this project, so those activities were conducted immediately after brainstorming and the sorting activity was conducted afterward.

We also used a somewhat unconventional approach for the sorting activity. CRISP and DEP desired more directed input from stakeholders than might be produced by sorting according to similarity. We therefore requested that participants sort the ideas according to who they thought should take the lead on implementing it. We did not define which organizations or any number of organizations that they should use.

While 25 stakeholders participated in the activity, only 17 followed the instructions and were included in the results. The instructions were included in the invitation and reminder emails, in the activity directions on the software platform, and in an

instructional video produced for the activity. The video is hosted on Youtube at <https://www.youtube.com/watch?v=9PH0e0Md1qU> and was viewed 42 times before the sorting activity concluded.

Results

Participants were asked to rate the statements according to importance and feasibility, using a Likert scale of 1 to 5, with 1 being least important or feasible and 5 being most important or feasible. The two ratings are illustrated together in the priority matrix below, with importance on the y-axis and feasibility on the x-axis.

The crosshairs represent the average rating for each activity. Statements that were rated above average for importance and feasibility, for example, are in the upper right quadrant in green. Statements in the top left quadrant were rated most important but less feasible, and statements in the lower right quadrant were rated most feasible but less important.

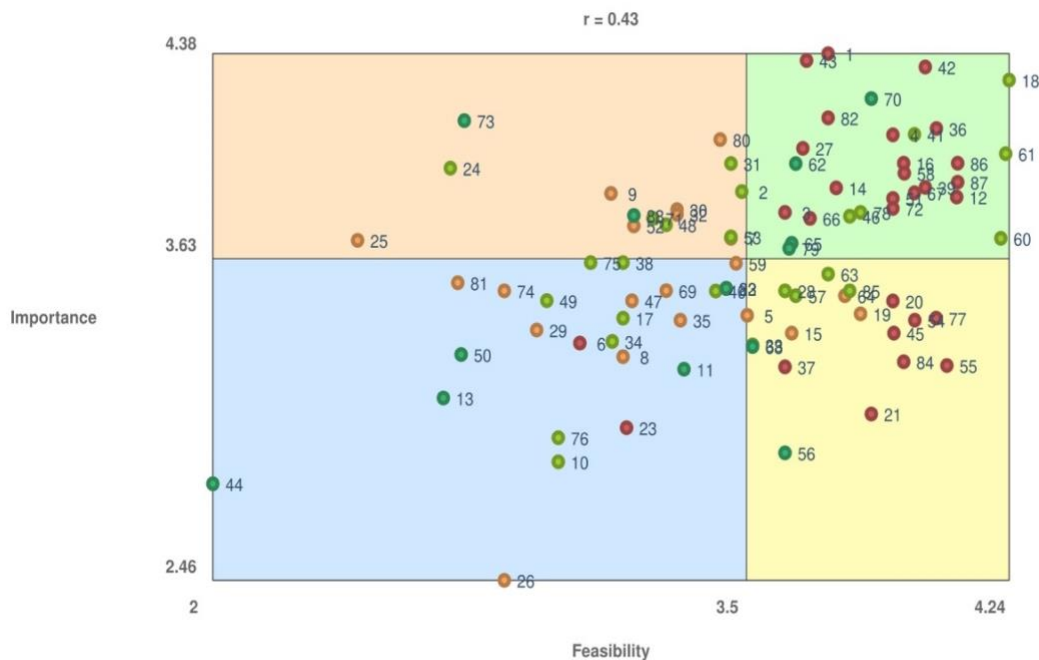


Figure 5. Priority Matrix

Another way to view the most highly rated statements is with a combined average score from the two ratings, which ranged from 8.52 to 4.81. A list of the 29 statements in the

top right quadrant, sorted by combined scores, are listed in the table below. A list of all statements and combined scores is included in Appendix C.

Table 2. Rating Scores, Sorted by Combined Mean

Statement Number	Importance	Feasibility	Combined	Statement
18	4.29	4.24	8.52	Create a BMP training program for municipal highway departments and landscapers to minimize introduction and spread of invasives
42	4.33	4.00	8.33	Collaborate with neighboring PRISMs to manage species that may be moving in from the border areas
61	4.02	4.23	8.24	Collaborate with the NY Hemlock Initiative on the release of hemlock woolly adelgid biocontrol agents and their efficacy
36	4.11	4.03	8.14	Increase management capacity through training students, citizen scientists, volunteers, landowners, and forest owners
1	4.38	3.73	8.11	Increase capacity to perform early detection and rapid response
70	4.22	3.86	8.08	Assess the success of management projects
86	3.98	4.09	8.07	Create a quick and easy way for landowners/stakeholders to ask questions and get answers and feedback to specific invasive species management topics via the web page
41	4.09	3.97	8.06	Work with DEC Region 3 and 4 permit staff to make sure that invasive species issues (SLF transport quarantines, clean equipment, native plant lists etc.) are flagged in permit reviews.
43	4.36	3.67	8.02	Work with local governments to build invasive species prevention and management into their planning and review processes
87	3.91	4.09	8.00	Finalize an invasive species management and monitoring protocol
4	4.09	3.91	8.00	Prioritize mitigation of threats to Catskills ecosystems and forest ecosystem processes (i.e. forest regeneration)
12	3.86	4.09	7.95	Increase outreach on spread prevention to Catskill recreationists and tourists
16	3.98	3.94	7.92	Investigate and implement the most effective education and outreach strategies
60	3.71	4.21	7.92	Maintain an active list of licensed pesticide applicator businesses with expertise at invasive plant removal for partners
39	3.89	4.00	7.89	Coordinate with local colleges and universities to investigate research needs and facilitate invasive species field learning labs/volunteer days for students in environmental fields
58	3.95	3.94	7.89	Develop/adopt best management practices for spread prevention on construction equipment and fill following the SLELO PRISM model

82	4.15	3.73	7.88	Coordinate activities between partners so there is minimal redundancy in management strategies to maximize the funding available for specific monitoring and research proposals
67	3.88	3.97	7.84	Develop uniform approaches to data collection by field crews
51	3.85	3.91	7.76	Develop the next generation of invasive species professionals through meaningful internships that provide hands on experience in the Catskills
72	3.82	3.91	7.73	Develop a procedure for objectively ranking invasives in order to triage the limited resources
27	4.04	3.66	7.69	Build capacity to perform site restoration at treatment sites and provide resources to partners for restoration
14	3.89	3.79	7.68	Identify and manage Invasive Species Prevention Zones based on low current invasion and critical habitats
78	3.80	3.82	7.62	Manage invasive plants that influence human health such as giant hogweed
62	3.98	3.64	7.62	Focus on early detection of aquatic invasive species
46	3.79	3.79	7.58	Create a strategic plan to deal with future hemlock loss
66	3.78	3.68	7.46	Advocate for prioritizing and funding treatment strategies for known infestations
3	3.80	3.61	7.41	Build Catskills specific citizen science program, adaptable to a wide audience (include college ecology programs), to provide information to volunteers and critical data to researchers, land managers, and agencies
65	3.69	3.63	7.32	Research & compare the range of methods available for reducing invasive annual plants (mile-a-minute, stiltgrass)
79	3.67	3.62	7.29	Collaborate to use plant species and water quality data to identify Invasive Species Prevention Zones

The variance of these ratings can be indicative of consensus. A smaller variance indicates a higher level of agreement. The table below shows the average variance in ratings for importance and feasibility, broken down by first quarter, first half, and second half. There appears to be an increasing level of consensus with the highest rated statements.

Table 3. Rating Variance

Combined Score Rank	Importance Variance	Feasibility Variance
1-22	0.86	0.85
1-44	0.92	0.97
45-88	1.26	1.15

Appendix D shows a priority matrix as above in Figure 5 and Appendix E shows a table of rating scores as in Table 2, but both are limited to data from DEP participants. Of the participants who selected DEP in the participant questions, 24 participated in the importance rating and 13 participated in the feasibility rating.

The final participant activity was to sort the statements. While the concept mapping process would normally have participants sort statements according to similarity, we asked participants to sort them according to which organization they thought should take the lead on implementation.

The first step of the analysis is to use multidimensional scaling to represent the results in a point map, shown in the figure below. Each point in the figure represents an idea, with its corresponding number next to it. The proximity between points represents the frequency with which the ideas were sorted together by all of the participants.



Figure 6. Point Map

Once the point map is created, clusters of points are delineated with hierarchical cluster analysis using Ward's minimum variance method. The final number of clusters is somewhat subjective, as it depends on a best fit with the particular set of ideas being organized. The two sponsors of this project anticipated a small number of clusters, and that did seem to fit well with the results.

The name of each cluster is also somewhat subjective but begins with the names of participants' groups with centroids closest to the centroid of the cluster. Those labels often repeat, and that was the case with the cluster map shown below in Figure 7. It shows four clusters, clockwise from the top left, are NYC DEP, NYS DEC, CRISP, and All.

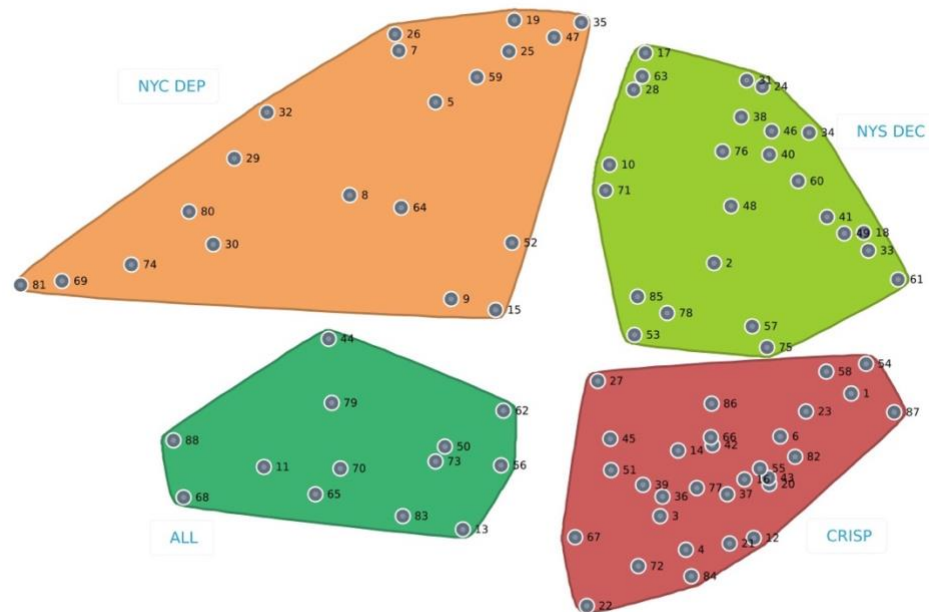


Figure 7. Cluster Map

The sorting seemed to emphasize the collaborative nature of the groups, with the All cluster requiring all organizations to work together on implementation. Some of the other organizations named along with each cluster are listed in the table below. The statements in Appendix F are listed with the cluster into which they were sorted.

Table 4. Lead Organizations and Collaborators

Lead Organization	Collaborating Organizations
NYC DEP	Soil & Water Conservation
	SUNY Oneonta
	NYS Dept of Agriculture & Markets
	PRISMS
	Boat Steward Program
	Land Managers
NYS DEC	CRISP

	Catskill Mountainkeeper
	New York State
CRISP	Catskill Center
	CCE
	NY/NJ Trail Conference
ALL	NYISRI
	Catskill Science Collaborative
	iMapInvasives
	Other - local NGOs, govts, academic institutions etc.

Clusters and ratings can also be visualized together, to illustrate the relative importance and feasibility of groups of statements. In the figures below, the cluster map integrates the ratings by adding layers to signify higher average scores. Figure 8 illustrates that the CRISP cluster includes the statements with the highest average importance ratings, followed by the NYS DEC cluster.

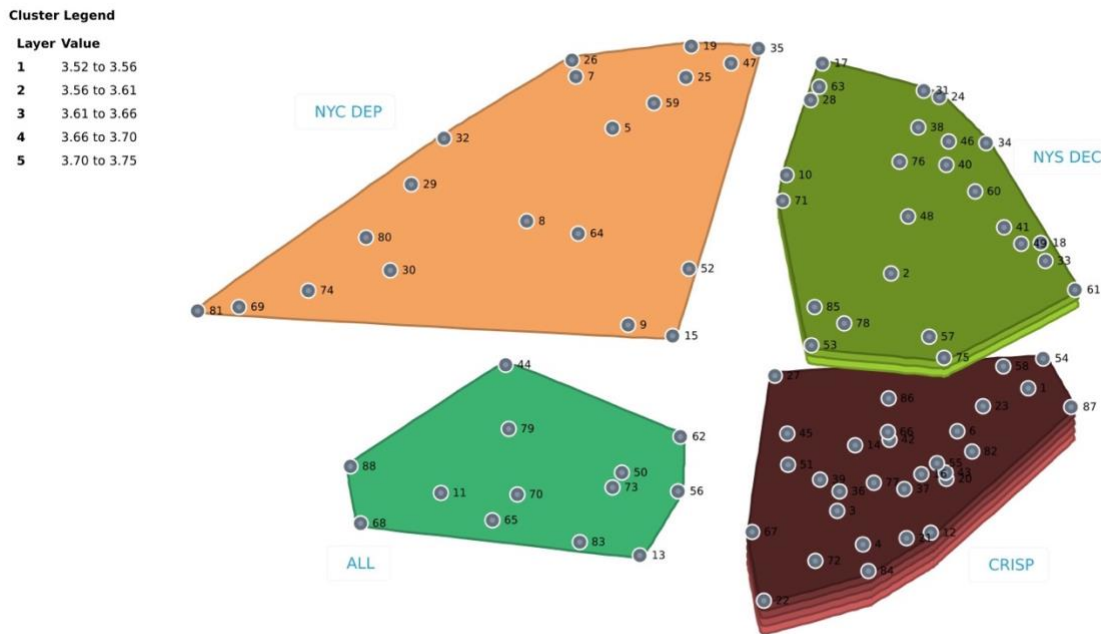


Figure 8. Cluster Rating Map, Importance

Likewise, Figure 9 illustrates that the CRISP cluster includes the statements with the highest average feasibility ratings, followed by the NYS DEC cluster.

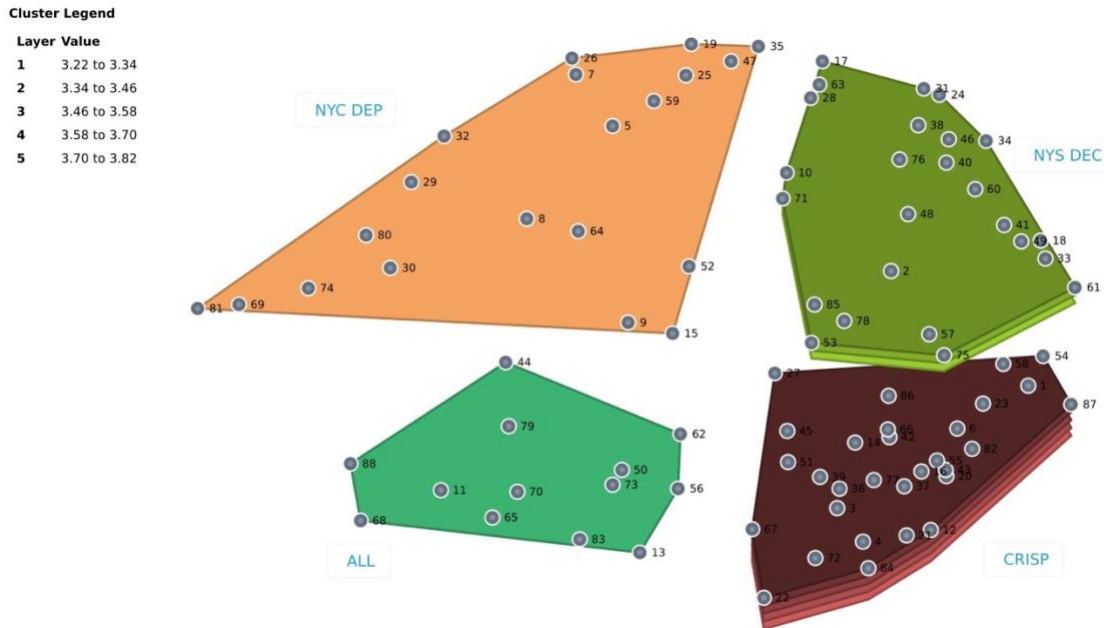


Figure 9. Cluster Rating Map, Feasibility

Another integration of sorting and rating data can be visualized with parallel coordinates, shown in the figures below. These show the average rating of each cluster by groups of participants. Each colored, horizontal line represents a cluster, which is labeled on the y-axis and is color coded to match the cluster map.

The vertical bars represent participant groups. In the figures below, the vertical line on the left includes all participants, while the groups to the right include participants from the NYC DEP, NYS DEC, and PRISM. The number of participants in each group is in parentheses next to the group name. The average high and low rating for each group is labeled at the top and bottom of the line.

It should be noted that PRISM is an optional answer for the 'employer/affiliation' participant question, created during the planning period of the project. CRISP is the group name that participants used when sorting. CRISP is one of the PRISMs, but in these results, PRISM represents those who selected that response in the participant questions and CRISP is the organization that the participants felt should lead the implementation on the statements in that cluster.

These can be a valuable way to highlight similar or contrasting perspectives of participant groups. Horizontally parallel lines represent agreement between groups. The degree to which cluster lines are not parallel, or even cross, indicate a lack of agreement. Like the cluster rating maps in figures 8 and 9 above, these figures show that the CRISP and DEC clusters were rated most important and most feasible.

The comparison between groups in the project, however, are not based on enough participant data to be statistically significant. The DEC group includes only two participants and the PRISM group includes just four participants. They are included primarily because all participants indicated that these organizations should lead the implementation of the statements in the two clusters, so illustrating the perspective of the participants with the closest affiliation to those organizations, albeit statistically insignificant, seemed important.

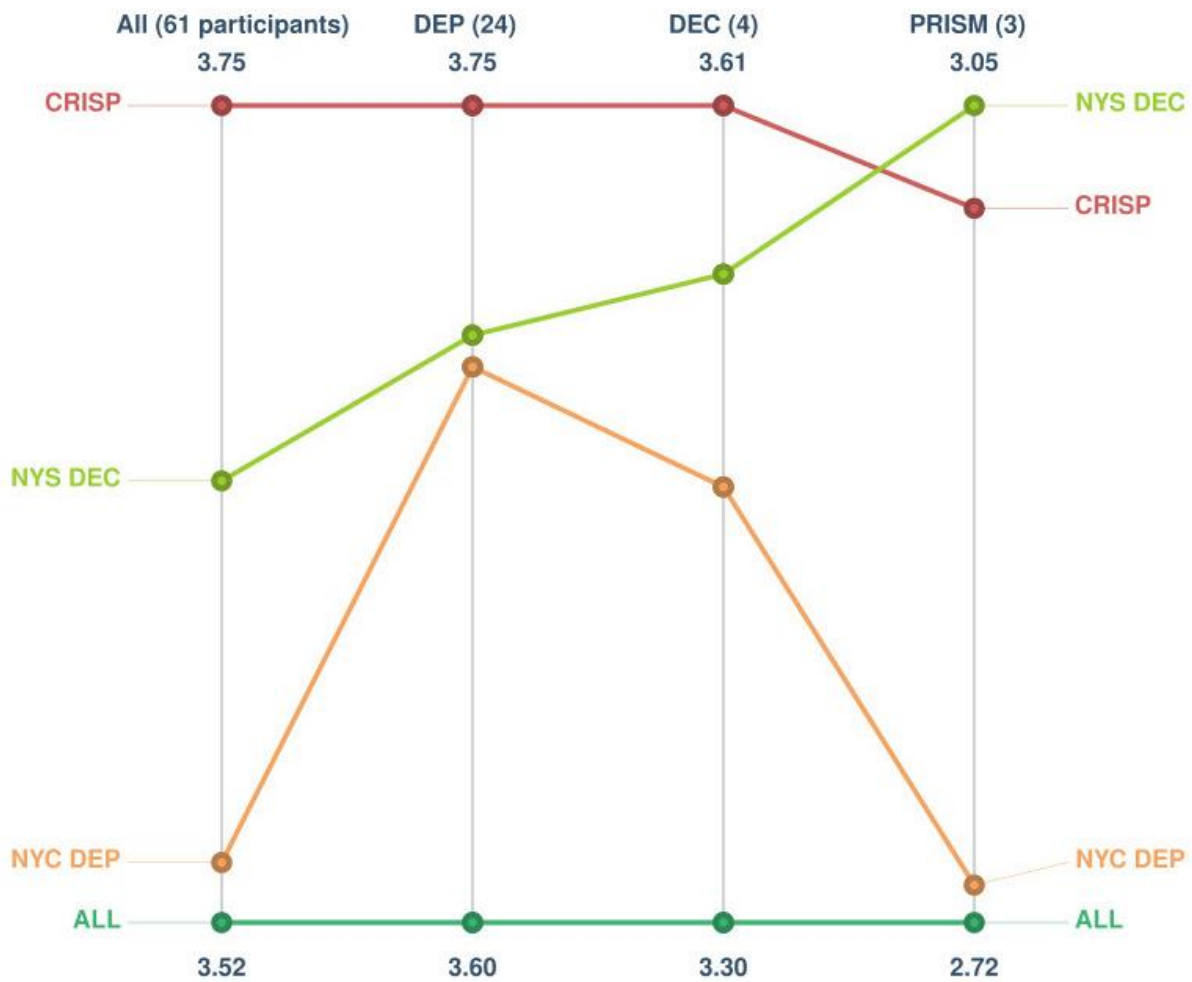


Figure 10. Parallel Coordinates, Importance

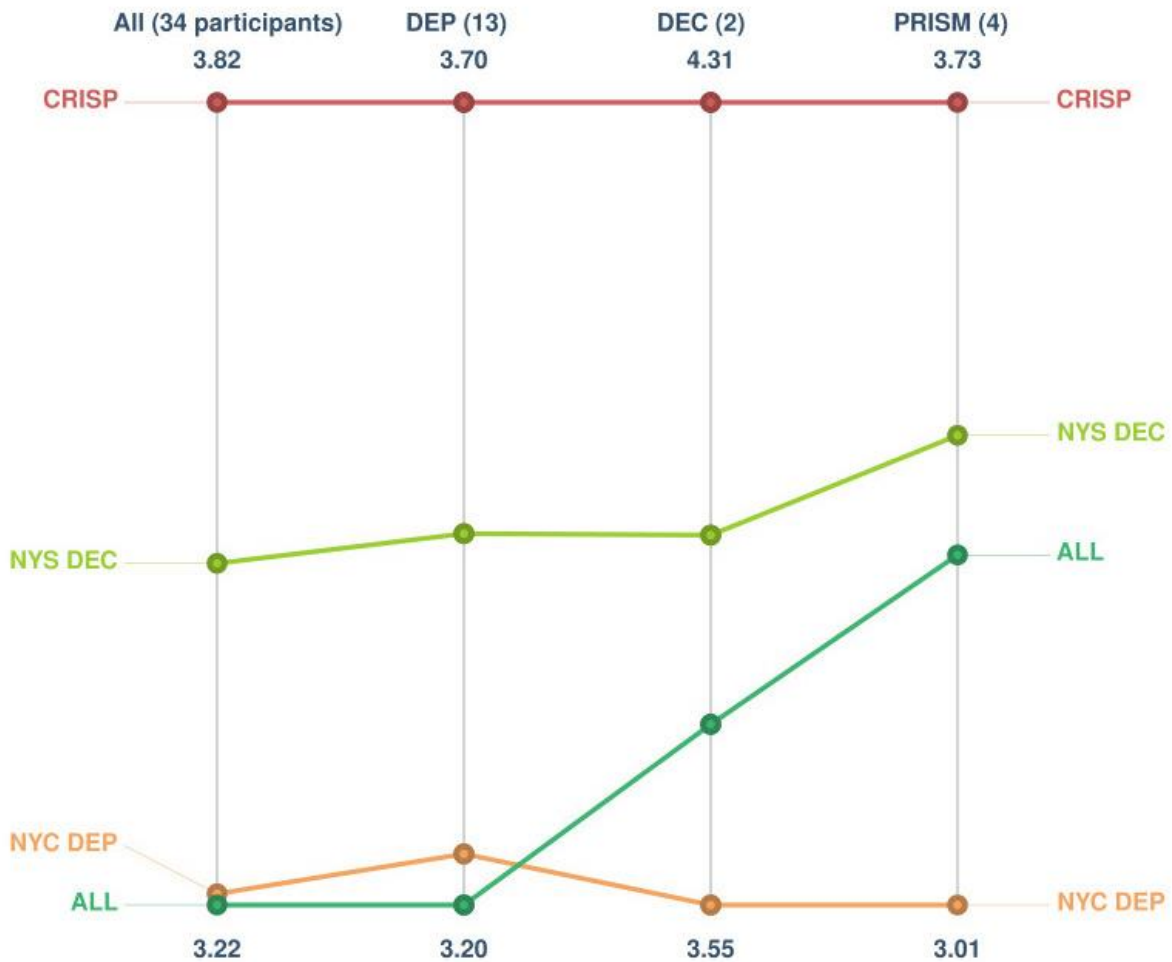


Figure 11. Parallel Coordinates, Feasibility

Discussion

The results indicate a successful process that provides insights into the makeup of the stakeholder group, the invasive species topics that they see as priorities, how the priorities compare in terms of importance and feasibility, and who the stakeholders feel should take the lead on implementing each priority.

Participants represented each of the segments that were anticipated, across role, employer or affiliation, primary habitat, and engagement with the topic. The most common responses were land managers, DEP employees, terrestrial habitat, and somewhat engaged.

Of the 88 priorities that were identified, 29 were above average in importance and feasibility. Interestingly, the variance of the ratings decreased with increased importance and feasibility, meaning that there is an increasing level of consensus regarding the top priorities.

The alternative sorting methodology may have reduced the participant data that could be included, but the results were interesting and likely more valuable than the conventional approach. Sorting produced four clusters of statements, identifying which organization should take the lead on implementation. These included NYC DEP, NYS DEC, CRISP, and All. Collaboration seemed to be a strong theme, not only for the All cluster, but also for collaborating organizations in the other three clusters.

When the ratings and clusters are combined, the CRISP cluster was rated both most important and most feasible, followed by the NYS DEC cluster. The combination of both ratings, with the identification of lead organizations, should be useful as a pipeline of prioritized projects for each organization, along with their collaborators.

References

- Concept Systems, I. (2022). *The Concept System® groupwisdom™*. In (Version 2021.24.01) <https://groupwisdom.com/>
- Trochim, W. M. K. (1989b). An introduction to concept mapping for planning and evaluation. *Evaluation and program planning*, 12(1), 1-16.
[https://doi.org/http://dx.doi.org/10.1016/0149-7189\(89\)90016-5](https://doi.org/http://dx.doi.org/10.1016/0149-7189(89)90016-5)

Appendix A. Invitation Emails

Subject Your Input is Requested on CRISP/NYC DEP Invasive Species Management Priorities

Date 12-3-21

Catskill Regional Invasive Species Partnership (CRISP) is working with partners to address invasive species issues in the greater Catskills region (<https://www.catskillinvasives.com/updates>). New York City Department of Environmental Protection (NYC DEP) has an invasive species program to protect the upstate water supply from invasive species threats to water quality and infrastructure. CRISP and NYC DEP are working together on a group concept mapping project to guide strategic planning specifically for invasive species management for the next 5 years. To assist us in this effort, we are looking for input from a variety of stakeholders with expertise in a broad range of geographic and taxonomic areas. When responding, please keep in mind that we are expecting ideas related to invasive species applied management goals (as opposed to general education or research goals).

You will find a link below to start the process. The first phase is brainstorming, where we invite you to contribute your ideas. You will see a single prompt to respond to. This phase will be open from December 3rd to December 31st. This brainstorming can be completed in as little as 2 minutes, but we appreciate the time and thought you put into it.

Your participation is voluntary, and your input will be anonymous and aggregated with the input from other participants.

Please let us know if you have any questions.

<https://participant.groupwisdom.tech/project/2005/brainstorming>

Subject: Importance Rating for CRISP/NYC DEP Invasive Species Management Priorities

Date: 1-11-22

We received excellent input on our joint Catskill Regional Invasive Species Partnership (CRISP) and New York City Department of Environmental Protection (NYC DEP) group concept mapping to guide invasive species management for the next 5 years. We received 160 statements from 83 contributions. Thank you!

Our next step is to rate the importance of 88 statements, synthesized from the original input. This activity is open until January 24. First, we ask you to **register with an email address and answer four quick questions**. These questions allow us to segment the

responses into similar groups, but your email address and responses are confidential and aggregated - individual responses are not identified.

Please click the link below to get started! You can log back in anytime to continue where you left off and let us know if you have any questions.

<https://participant.groupwisdom.tech/project/2005/rating/3297>

Subject Feasibility Rating for CRISP/NYC DEP Invasive Species Management Priorities

Date: 1-18-22

Our next step in Catskill Group Concept Mapping is to rate the **feasibility** of 88 statements, synthesized from the original input. This activity is open until January 24. If you previously registered, click the 'login' link. You'll be asked to answer the participant questions if you haven't already.

Those who have not yet registered, will be asked to **register with an email address** and to **answer four quick questions**. These questions allow us to segment the responses into similar groups, but your email address and responses are confidential and aggregated - individual responses are not identified.

Please click the link below to get started or continue. You can log back in anytime to continue where you left off. Please let us know if you have any questions.

<https://participant.groupwisdom.tech/project/2005/rating/>

Subject: Invitation to Catskill Group Concept Mapping Sorting

Date: 1-31-21

Our final participant activity in the CRISP/NYC DEP Group Concept Mapping project is to sort the statements. We would like you to determine which organization should implement each statement. Please determine if CRISP, NYC DEP, or other agency, or organization, is best positioned to implement the action. Please complete the sorting by Monday February 8th. A sorting demonstration video is available here:

<https://youtu.be/9PH0e0Md1qU>

We greatly appreciate your time and consideration in contributing to our Group Concept Mapping! We will analyze the results and have them available this spring.

Please click the link below to get started or continue. You can log back in anytime to continue where you left off. Please let us know if you have any questions.

<https://participant.groupwisdom.tech/login>

Appendix B. Statements Sorted by Statement Number

Statement #	Statement
1	Increase capacity to perform early detection and rapid response
2	Facilitate expanded rapid response by providing funds for groups/organizations that can coordinate local response
3	Build Catskills specific citizen science program, adaptable to a wide audience (include college ecology programs), to provide information to volunteers and critical data to researchers, land managers, and agencies
4	Prioritize mitigation of threats to Catskills ecosystems and forest ecosystem processes (i.e. forest regeneration)
5	Assess impacts of beech leaf disease and support identifying strategies to mitigate the impacts in the Catskills and potential loss of beech
6	Increase Jumping Worm mitigation and outreach, adapting program according to new research and successful strategies from other programs
7	Mount a coordinated Spotted Lanternfly rapid response
8	Introduction of Eriophyid mites as a biological control of tree of heaven in order to slow the spread of the spotted lantern fly,
9	Actively monitor areas where spotted lantern fly has established in CRISP and Hudson Valley, and is likely to, and mitigate tree canopy loss (also applies to areas hit by emerald ash borer).
10	Actively monitor areas where EAB has established/is likely to and mitigate tree canopy loss
11	Treat and remove tree of heaven in satellite populations and introduce Eriophyid mites as biocontrol
12	Increase outreach on spread prevention to Catskill recreationists and tourists
13	Consider management of Jumping Worms based on their synergistic impacts with other invasives and soils
14	Identify and manage Invasive Species Prevention Zones based on low current invasion and critical habitats
15	Increase pesticide application capacity for rapid responses
16	Investigate and implement the most effective education and outreach strategies
17	Increased access to treatment for pests like Hemlock Woolly Adelgid and Emerald Ash Borers for private landowners, including providing funding
18	Create a BMP training program for municipal highway departments and landscapers to minimize introduction and spread of invasives
19	Explore feasibility of standalone solar powered boat washing facilities for anglers and boaters at high traffic waterways
20	Provide BMP training and demonstrations for management of Tier 3 & 4 species
21	Create a "teaching trail" for public education and to showcase management
22	Streamline data streams (citizen, agency, academics) and dissemination for use in outreach, management, and research
23	Prioritize European Frogbit for Early Detection and Rapid Response
24	Prevent introduction of new forest pests and pathogens including advocating for federal action
25	Limit the spread of snakehead within the Delaware River watershed
26	Incentivise Japanese knotweed utilization
27	Build capacity to perform site restoration at treatment sites and provide resources to partners for restoration

28	Identify a suitable facility for invasive species or invasive-contaminated soil disposal
29	Treat Japanese knotweed in headwaters and systematically work downstream
30	Support riparian restoration programs through invasive plant suppression (knotweed)
31	Continue to protect hemlock forests
32	Assess threats to riparian forest overstory that maintain channel morphology and the presence of likely replacement species
33	Advocate for State budget line to provide hemlock woolly adelgid and emerald ash borer treatment certification free or low cost to arborists
34	Create an adoption program for state lands for people to support invasive pest management, either financially or through volunteer work (Adopt a hemlock grove or a knotweed stand, for example)
35	Repopulate native brook trout instead of annual stocking with non-native trout species
36	Increase management capacity through training students, citizen scientists, volunteers, landowners, and forest owners
37	Focus on important goals/outcomes and how IS management supports those goals/outcomes, not on invasive species per se.
38	Strategically incorporate climate change impacts and carbon sequestration into all management decisions
39	Coordinate with local colleges and universities to investigate research needs and facilitate invasive species field learning labs/volunteer days for students in environmental fields
40	Provide funding to train certified applicators to safely control target invasive species
41	Work with DEC Region 3 and 4 permit staff to make sure that invasive species issues (SLF transport quarantines, clean equipment, native plant lists etc.) are flagged in permit reviews.
42	Collaborate with neighboring PRISMs to manage species that may be moving in from the border areas
43	Work with local governments to build invasive species prevention and management into their planning and review processes
44	Eradicate water chestnut from the region
45	Survey around nurseries, arboretums, and formal gardens for invasive ornamental escapes
46	Create a strategic plan to deal with future hemlock loss
47	Provide funding/reimbursement for landowners treating hemlocks that are a critical part of restoring or maintaining their riparian buffer
48	Identify potential resistant hemlock trees
49	Obtain alternative funding to build up capacity beyond the NYS EPF funding for CRISP to provide resilience in case of future contract gaps
50	Tackle invasive species that host ticks in high traffic areas in order to prevent the spread of invasives to other areas and also prevent tick borne illness
51	Develop the next generation of invasive species professionals through meaningful internships that provide hands on experience in the Catskills
52	Create an eDNA program for the Catskills to regularly survey throughout the region for invasive fish and aquatic plants as the technology matures
53	Work with county soil and water conservation districts on native plant sales, offering a free native replacement for any invasive plants removed
54	Create a clearinghouse for information on available biological control organisms for partners
55	Create a simple flow-chart based graphic for actions based on the detection of species from each tier as public facing tool to manage expectations on PRISM response and landowner responsibilities
56	Conduct an assessment of trailheads and determine the best locations for boot brush stations
57	Create an annual campground and lake survey program for new introductions

58	Develop/adopt best management practices for spread prevention on construction equipment and fill following the SLELO PRISM model
59	Improve invasive species prevention infrastructure and inspection steward staffing and capacity at public boat launches
60	Maintain an active list of licensed pesticide applicator businesses with expertise at invasive plant removal for partners
61	Collaborate with the NY Hemlock Initiative on the release of hemlock woolly adelgid biocontrol agents and their efficacy
62	Focus on early detection of aquatic invasive species
63	Create a program to collect existing data and prioritize lakes for surveying, monitoring, and control efforts
64	Engage watercraft stewards in aquatic invasive species management
65	Research & compare the range of methods available for reducing invasive annual plants (mile-a-minute, stiltgrass)
66	Advocate for prioritizing and funding treatment strategies for known infestations
67	Develop uniform approaches to data collection by field crews
68	Determine what data can easily be collected in the field to validate remote sensing imagery for the purposes of invasive species detection
69	Conduct a survey of high erosion sites in Catskill streams to assess invasive species impacts on erosion rates in Catskill aquatic systems
70	Assess the success of management projects
71	Track the spread of invasive forest insect pests
72	Develop a procedure for objectively ranking invasives in order to triage the limited resources
73	Prevent aquatic invasive species spread
74	Assess water quality impacts associated with each invasive species
75	Identify initial source(s) of invasives and pathways to Catskills
76	Track the spread of emerald ash borer
77	Promote use of boot brushes, cleaning of ATVs/vehicles, shoes, etc.
78	Manage invasive plants that influence human health such as giant hogweed
79	Collaborate to use plant species and water quality data to identify Invasive Species Prevention Zones
80	Manage riparian zone invasive species and restore these areas with native riparian plant communities
81	Eradicate the hydrilla in New Croton Reservoir
82	Coordinate activities between partners so there is minimal redundancy in management strategies to maximize the funding available for specific monitoring and research proposals
83	Map areas of native plants that could provide regional seed stock for revegetation for post-control restoration efforts
84	Provide specific models/examples of communities that have successfully organized campaigns across multiple organizations and stakeholders to manage invasive species in their area
85	Use continuing education credits as a tool to promote early detection species education among professionals working across the landscape.
86	Create a quick and easy way for landowners/stakeholders to ask questions and get answers and feedback to specific invasive species management topics via the web page
87	Finalize an invasive species management and monitoring protocol
88	Develop early detection tools (possibly remote sensing) to better understand the spatial extent of invasive species of concern and the ecological impacts they might be having

Appendix C. Statements Sorted by Combined Rating Mean

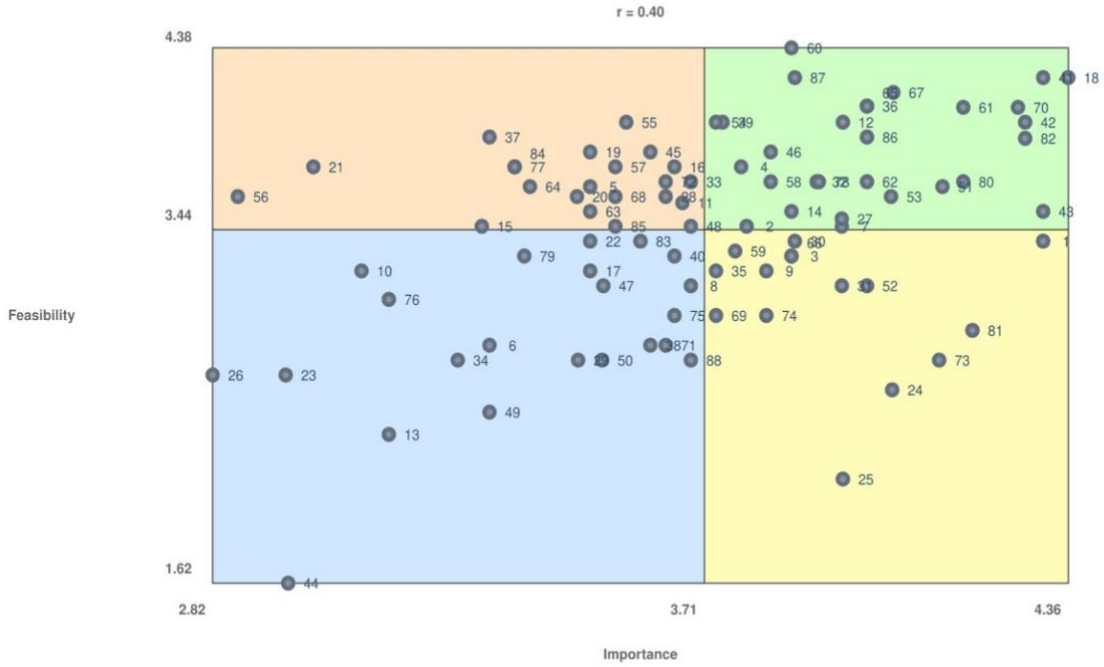
Statement #	Statement	Importance Mean	Feasibility Mean	Combined Mean
18	Create a BMP training program for municipal highway departments and landscapers to minimize introduction and spread of invasives	4.29	4.24	8.52
42	Collaborate with neighboring PRISMs to manage species that may be moving in from the border areas	4.33	4.00	8.33
61	Collaborate with the NY Hemlock Initiative on the release of hemlock woolly adelgid biocontrol agents and their efficacy	4.02	4.23	8.24
36	Increase management capacity through training students, citizen scientists, volunteers, landowners, and forest owners	4.11	4.03	8.14
1	Increase capacity to perform early detection and rapid response	4.38	3.73	8.11
70	Assess the success of management projects	4.22	3.86	8.08
86	Create a quick and easy way for landowners/stakeholders to ask questions and get answers and feedback to specific invasive species management topics via the web page	3.98	4.09	8.07
41	Work with DEC Region 3 and 4 permit staff to make sure that invasive species issues (SLF transport quarantines, clean equipment, native plant lists etc.) are flagged in permit reviews.	4.09	3.97	8.06
43	Work with local governments to build invasive species prevention and management into their planning and review processes	4.36	3.67	8.02
87	Finalize an invasive species management and monitoring protocol	3.91	4.09	8.00
4	Prioritize mitigation of threats to Catskills ecosystems and forest ecosystem processes (i.e. forest regeneration)	4.09	3.91	8.00
12	Increase outreach on spread prevention to Catskill recreationists and tourists	3.86	4.09	7.95
16	Investigate and implement the most effective education and outreach strategies	3.98	3.94	7.92
60	Maintain an active list of licensed pesticide applicator businesses with expertise at invasive plant removal for partners	3.71	4.21	7.92
39	Coordinate with local colleges and universities to investigate research needs and facilitate invasive species field learning labs/volunteer days for students in environmental fields	3.89	4.00	7.89
58	Develop/adopt best management practices for spread prevention on construction equipment and fill following the SLELO PRISM model	3.95	3.94	7.89
82	Coordinate activities between partners so there is minimal redundancy in management strategies to maximize the funding available for specific monitoring and research proposals	4.15	3.73	7.88
67	Develop uniform approaches to data collection by field crews	3.88	3.97	7.84
51	Develop the next generation of invasive species professionals through meaningful internships that provide hands on experience in the Catskills	3.85	3.91	7.76

72	Develop a procedure for objectively ranking invasives in order to triage the limited resources	3.82	3.91	7.73
27	Build capacity to perform site restoration at treatment sites and provide resources to partners for restoration	4.04	3.66	7.69
14	Identify and manage Invasive Species Prevention Zones based on low current invasion and critical habitats	3.89	3.79	7.68
78	Manage invasive plants that influence human health such as giant hogweed	3.80	3.82	7.62
62	Focus on early detection of aquatic invasive species	3.98	3.64	7.62
46	Create a strategic plan to deal with future hemlock loss	3.79	3.79	7.58
80	Manage riparian zone invasive species and restore these areas with native riparian plant communities	4.07	3.42	7.49
66	Advocate for prioritizing and funding treatment strategies for known infestations	3.78	3.68	7.46
77	Promote use of boot brushes, cleaning of ATVs/vehicles, shoes, etc.	3.42	4.03	7.45
31	Continue to protect hemlock forests	3.98	3.45	7.44
3	Build Catskills specific citizen science program, adaptable to a wide audience (include college ecology programs), to provide information to volunteers and critical data to researchers, land managers, and agencies	3.80	3.61	7.41
20	Provide BMP training and demonstrations for management of Tier 3 & 4 species	3.48	3.91	7.39
54	Create a clearinghouse for information on available biological control organisms for partners	3.41	3.97	7.38
2	Facilitate expanded rapid response by providing funds for groups/organizations that can coordinate local response	3.88	3.48	7.36
65	Research & compare the range of methods available for reducing invasive annual plants (mile-a-minute, stiltgrass)	3.69	3.63	7.32
63	Create a program to collect existing data and prioritize lakes for surveying, monitoring, and control efforts	3.58	3.73	7.31
85	Use continuing education credits as a tool to promote early detection species education among professionals working across the landscape.	3.52	3.79	7.31
55	Create a simple flow-chart based graphic for actions based on the detection of species from each tier as public facing tool to manage expectations on PRISM response and landowner responsibilities	3.24	4.06	7.30
79	Collaborate to use plant species and water quality data to identify Invasive Species Prevention Zones	3.67	3.62	7.29
45	Survey around nurseries, arboretums, and formal gardens for invasive ornamental escapes	3.38	3.91	7.29
64	Engage watercraft stewards in aquatic invasive species management	3.50	3.77	7.27
19	Explore feasibility of standalone solar powered boat washing facilities for anglers and boaters at high traffic waterways	3.43	3.82	7.25
84	Provide specific models/examples of communities that have successfully organized campaigns across multiple organizations and stakeholders to manage invasive species in their area	3.26	3.94	7.20
53	Work with county soil and water conservation districts on native plant sales, offering a free native replacement for any invasive plants removed	3.71	3.45	7.17

7	Mount a coordinated Spotted Lanternfly rapid response	3.71	3.45	7.16
57	Create an annual campground and lake survey program for new introductions	3.50	3.64	7.14
28	Identify a suitable facility for invasive species or invasive-contaminated soil disposal	3.52	3.61	7.12
30	Support riparian restoration programs through invasive plant suppression (knotweed)	3.81	3.30	7.12
32	Assess threats to riparian forest overstory that maintain channel morphology and the presence of likely replacement species	3.80	3.30	7.10
59	Improve invasive species prevention infrastructure and inspection steward staffing and capacity at public boat launches	3.62	3.47	7.09
48	Identify potential resistant hemlock trees	3.76	3.27	7.03
9	Actively monitor areas where spotted lantern fly has established in CRISP and Hudson Valley, and is likely to, and mitigate tree canopy loss (also applies to areas hit by emerald ash borer).	3.87	3.12	6.99
15	Increase pesticide application capacity for rapid responses	3.36	3.63	6.99
71	Track the spread of invasive forest insect pests	3.78	3.20	6.98
88	Develop early detection tools (possibly remote sensing) to better understand the spatial extent of invasive species of concern and the ecological impacts they might be having	3.79	3.18	6.97
83	Map areas of native plants that could provide regional seed stock for revegetation for post-control restoration efforts	3.53	3.44	6.97
22	Streamline data streams (citizen, agency, academics) and dissemination for use in outreach, management, and research	3.53	3.44	6.97
52	Create an eDNA program for the Catskills to regularly survey throughout the region for invasive fish and aquatic plants as the technology matures	3.75	3.18	6.94
40	Provide funding to train certified applicators to safely control target invasive species	3.52	3.41	6.93
21	Create a "teaching trail" for public education and to showcase management	3.07	3.85	6.92
5	Assess impacts of beech leaf disease and support identifying strategies to mitigate the impacts in the Catskills and potential loss of beech	3.40	3.50	6.90
37	Focus on important goals/outcomes and how IS management supports those goals/outcomes, not on invasive species per se.	3.24	3.61	6.85
73	Prevent aquatic invasive species spread	4.14	2.71	6.84
33	Advocate for State budget line to provide hemlock woolly adelgid and emerald ash borer treatment certification free or low cost to arborists	3.32	3.52	6.84
69	Conduct a survey of high erosion sites in Catskill streams to assess invasive species impacts on erosion rates in Catskill aquatic systems	3.52	3.27	6.79
68	Determine what data can easily be collected in the field to validate remote sensing imagery for the purposes of invasive species detection	3.31	3.47	6.79
38	Strategically incorporate climate change impacts and carbon sequestration into all management decisions	3.62	3.15	6.77

35	Repopulate native brook trout instead of annual stocking with non-native trout species	3.41	3.31	6.72
75	Identify initial source(s) of invasives and pathways to Catskills	3.62	3.06	6.68
47	Provide funding/reimbursement for landowners treating hemlocks that are a critical part of restoring or maintaining their riparian buffer	3.48	3.18	6.66
24	Prevent introduction of new forest pests and pathogens including advocating for federal action	3.96	2.67	6.63
17	Increased access to treatment for pests like Hemlock Woolly Adelgid and Emerald Ash Borers for private landowners, including providing funding	3.42	3.15	6.57
11	Treat and remove tree of heaven in satellite populations and introduce Eriophyid mites as biocontrol	3.23	3.32	6.55
56	Conduct an assessment of trailheads and determine the best locations for boot brush stations	2.93	3.61	6.53
34	Create an adoption program for state lands for people to support invasive pest management, either financially or through volunteer work (Adopt a hemlock grove or a knotweed stand, for example)	3.33	3.12	6.45
8	Introduction of Eriophyid mites as a biological control of tree of heaven in order to slow the spread of the spotted lantern fly,	3.28	3.15	6.43
49	Obtain alternative funding to build up capacity beyond the NYS EPF funding for CRISP to provide resilience in case of future contract gaps	3.48	2.94	6.42
6	Increase Jumping Worm mitigation and outreach, adapting program according to new research and successful strategies from other programs	3.33	3.03	6.36
74	Assess water quality impacts associated with each invasive species	3.52	2.82	6.34
29	Treat Japanese knotweed in headwaters and systematically work downstream	3.38	2.91	6.28
81	Eradicate the hydrilla in New Croton Reservoir	3.55	2.69	6.23
23	Prioritize European Frogbit for Early Detection and Rapid Response	3.02	3.16	6.18
25	Limit the spread of snakehead within the Delaware River watershed	3.70	2.42	6.13
50	Tackle invasive species that host ticks in high traffic areas in order to prevent the spread of invasives to other areas and also prevent tick borne illness	3.29	2.68	5.96
76	Track the spread of emerald ash borer	2.95	2.97	5.92
10	Actively monitor areas where EAB has established/is likely to and mitigate tree canopy loss	2.89	2.97	5.86
13	Consider management of Jumping Worms based on their synergistic impacts with other invasives and soils	3.13	2.65	5.77
26	Incentivise Japanese knotweed utilization	2.46	2.76	5.23
44	Eradicate water chestnut from the region	2.81	2.00	4.81

Appendix D. Priority Matrix (DEP Participants Only)



Appendix E. Statements Sorted by Combined Rating Mean (DEP Participants Only)

Statement #	Statement	Importance Mean	Feasibility Mean	Combined Mean
18	Create a BMP training program for municipal highway departments and landscapers to minimize introduction and spread of invasives	4.36	4.23	8.59
41	Work with DEC Region 3 and 4 permit staff to make sure that invasive species issues (SLF transport quarantines, clean equipment, native plant lists etc.) are flagged in permit reviews.	4.32	4.23	8.55
70	Assess the success of management projects	4.27	4.08	8.35
42	Collaborate with neighboring PRISMs to manage species that may be moving in from the border areas	4.29	4.00	8.29
61	Collaborate with the NY Hemlock Initiative on the release of hemlock woolly adelgid biocontrol agents and their efficacy	4.17	4.08	8.25
60	Maintain an active list of licensed pesticide applicator businesses with expertise at invasive plant removal for partners	3.86	4.38	8.25
82	Coordinate activities between partners so there is minimal redundancy in management strategies to maximize the funding available for specific monitoring and research proposals	4.29	3.92	8.20
67	Develop uniform approaches to data collection by field crews	4.05	4.15	8.20
87	Finalize an invasive species management and monitoring protocol	3.87	4.23	8.10
36	Increase management capacity through training students, citizen scientists, volunteers, landowners, and forest owners	4.00	4.08	8.08
65	Research & compare the range of methods available for reducing invasive annual plants (mile-a-minute, stiltgrass)	4.00	4.08	8.08
12	Increase outreach on spread prevention to Catskill recreationists and tourists	3.96	4.00	7.96
86	Create a quick and easy way for landowners/stakeholders to ask questions and get answers and feedback to specific invasive species management topics via the web page	4.00	3.92	7.92
80	Manage riparian zone invasive species and restore these areas with native riparian plant communities	4.17	3.69	7.87
43	Work with local governments to build invasive species prevention and management into their planning and review processes	4.32	3.54	7.86
51	Develop the next generation of invasive species professionals through meaningful internships that provide hands on experience in the Catskills	4.14	3.67	7.80
39	Coordinate with local colleges and universities to investigate research needs and facilitate invasive species field learning labs/volunteer days for students in environmental fields	3.74	4.00	7.74
54	Create a clearinghouse for information on available biological control organisms for partners	3.73	4.00	7.73
1	Increase capacity to perform early detection and rapid response	4.32	3.38	7.70

62	Focus on early detection of aquatic invasive species	4.00	3.69	7.69
46	Create a strategic plan to deal with future hemlock loss	3.83	3.85	7.67
53	Work with county soil and water conservation districts on native plant sales, offering a free native replacement for any invasive plants removed	4.04	3.62	7.66
78	Manage invasive plants that influence human health such as giant hogweed	3.91	3.69	7.61
32	Assess threats to riparian forest overstory that maintain channel morphology and the presence of likely replacement species	3.91	3.69	7.60
55	Create a simple flow-chart based graphic for actions based on the detection of species from each tier as public facing tool to manage expectations on PRISM response and landowner responsibilities	3.57	4.00	7.57
4	Prioritize mitigation of threats to Catskills ecosystems and forest ecosystem processes (i.e. forest regeneration)	3.77	3.77	7.54
58	Develop/adopt best management practices for spread prevention on construction equipment and fill following the SLELO PRISM model	3.83	3.69	7.52
45	Survey around nurseries, arboretums, and formal gardens for invasive ornamental escapes	3.61	3.85	7.45
27	Build capacity to perform site restoration at treatment sites and provide resources to partners for restoration	3.95	3.50	7.45
16	Investigate and implement the most effective education and outreach strategies	3.65	3.77	7.42
7	Mount a coordinated Spotted Lanternfly rapid response	3.95	3.46	7.42
14	Identify and manage Invasive Species Prevention Zones based on low current invasion and critical habitats	3.86	3.54	7.40
33	Advocate for State budget line to provide hemlock woolly adelgid and emerald ash borer treatment certification free or low cost to arborists	3.68	3.69	7.37
19	Explore feasibility of standalone solar powered boat washing facilities for anglers and boaters at high traffic waterways	3.50	3.85	7.35
72	Develop a procedure for objectively ranking invasives in order to triage the limited resources	3.64	3.69	7.33
57	Create an annual campground and lake survey program for new introductions	3.55	3.77	7.31
30	Support riparian restoration programs through invasive plant suppression (knotweed)	3.87	3.38	7.25
28	Identify a suitable facility for invasive species or invasive-contaminated soil disposal	3.64	3.62	7.25
11	Treat and remove tree of heaven in satellite populations and introduce Eriophyid mites as biocontrol	3.67	3.58	7.25
2	Facilitate expanded rapid response by providing funds for groups/organizations that can coordinate local response	3.78	3.46	7.24
37	Focus on important goals/outcomes and how IS management supports those goals/outcomes, not on invasive species per se.	3.32	3.92	7.24
3	Build Catskills specific citizen science program, adaptable to a wide audience (include college ecology programs), to provide information to volunteers and critical data to researchers, land managers, and agencies	3.86	3.31	7.17

66	Advocate for prioritizing and funding treatment strategies for known infestations	3.86	3.31	7.17
5	Assess impacts of beech leaf disease and support identifying strategies to mitigate the impacts in the Catskills and potential loss of beech	3.50	3.67	7.17
68	Determine what data can easily be collected in the field to validate remote sensing imagery for the purposes of invasive species detection	3.55	3.62	7.16
52	Create an eDNA program for the Catskills to regularly survey throughout the region for invasive fish and aquatic plants as the technology matures	4.00	3.15	7.15
48	Identify potential resistant hemlock trees	3.68	3.46	7.14
77	Promote use of boot brushes, cleaning of ATVs/vehicles, shoes, etc.	3.36	3.77	7.13
84	Provide specific models/examples of communities that have successfully organized campaigns across multiple organizations and stakeholders to manage invasive species in their area	3.36	3.77	7.13
81	Eradicate the hydrilla in New Croton Reservoir	4.19	2.92	7.11
31	Continue to protect hemlock forests	3.95	3.15	7.11
59	Improve invasive species prevention infrastructure and inspection steward staffing and capacity at public boat launches	3.76	3.33	7.10
20	Provide BMP training and demonstrations for management of Tier 3 & 4 species	3.48	3.62	7.09
64	Engage watercraft stewards in aquatic invasive species management	3.39	3.67	7.06
9	Actively monitor areas where spotted lantern fly has established in CRISP and Hudson Valley, and is likely to, and mitigate tree canopy loss (also applies to areas hit by emerald ash borer).	3.82	3.23	7.05
63	Create a program to collect existing data and prioritize lakes for surveying, monitoring, and control efforts	3.50	3.54	7.04
85	Use continuing education credits as a tool to promote early detection species education among professionals working across the landscape.	3.55	3.46	7.01
83	Map areas of native plants that could provide regional seed stock for revegetation for post-control restoration efforts	3.59	3.38	6.98
40	Provide funding to train certified applicators to safely control target invasive species	3.65	3.31	6.96
35	Repopulate native brook trout instead of annual stocking with non-native trout species	3.73	3.23	6.96
73	Prevent aquatic invasive species spread	4.13	2.77	6.90
22	Streamline data streams (citizen, agency, academics) and dissemination for use in outreach, management, and research	3.50	3.38	6.88
8	Introduction of Eriophyid mites as a biological control of tree of heaven in order to slow the spread of the spotted lantern fly,	3.68	3.15	6.84
74	Assess water quality impacts associated with each invasive species	3.82	3.00	6.82
21	Create a "teaching trail" for public education and to showcase management	3.00	3.77	6.77

15	Increase pesticide application capacity for rapid responses	3.30	3.46	6.77
17	Increased access to treatment for pests like Hemlock Woolly Adelgid and Emerald Ash Borers for private landowners, including providing funding	3.50	3.23	6.73
69	Conduct a survey of high erosion sites in Catskill streams to assess invasive species impacts on erosion rates in Catskill aquatic systems	3.73	3.00	6.73
79	Collaborate to use plant species and water quality data to identify Invasive Species Prevention Zones	3.38	3.31	6.69
47	Provide funding/reimbursement for landowners treating hemlocks that are a critical part of restoring or maintaining their riparian buffer	3.52	3.15	6.68
24	Prevent introduction of new forest pests and pathogens including advocating for federal action	4.05	2.62	6.66
75	Identify initial source(s) of invasives and pathways to Catskills	3.65	3.00	6.65
71	Track the spread of invasive forest insect pests	3.64	2.85	6.48
56	Conduct an assessment of trailheads and determine the best locations for boot brush stations	2.86	3.62	6.48
38	Strategically incorporate climate change impacts and carbon sequestration into all management decisions	3.61	2.85	6.45
88	Develop early detection tools (possibly remote sensing) to better understand the spatial extent of invasive species of concern and the ecological impacts they might be having	3.68	2.77	6.45
10	Actively monitor areas where EAB has established/is likely to and mitigate tree canopy loss	3.09	3.23	6.32
50	Tackle invasive species that host ticks in high traffic areas in order to prevent the spread of invasives to other areas and also prevent tick borne illness	3.52	2.77	6.29
29	Treat Japanese knotweed in headwaters and systematically work downstream	3.48	2.77	6.25
76	Track the spread of emerald ash borer	3.14	3.08	6.22
6	Increase Jumping Worm mitigation and outreach, adapting program according to new research and successful strategies from other programs	3.32	2.85	6.16
25	Limit the spread of snakehead within the Delaware River watershed	3.96	2.15	6.11
34	Create an adoption program for state lands for people to support invasive pest management, either financially or through volunteer work (Adopt a hemlock grove or a knotweed stand, for example)	3.26	2.77	6.03
49	Obtain alternative funding to build up capacity beyond the NYS EPF funding for CRISP to provide resilience in case of future contract gaps	3.32	2.50	5.82
23	Prioritize European Frogbit for Early Detection and Rapid Response	2.95	2.69	5.64
13	Consider management of Jumping Worms based on their synergistic impacts with other invasives and soils	3.14	2.38	5.52
26	Incentivise Japanese knotweed utilization	2.82	2.69	5.51
44	Eradicate water chestnut from the region	2.95	1.62	4.57

Appendix F. Statements Sorted by Organization Cluster and Combined Rating Mean

Statement #	Statement	Cluster	Importance Mean	Feasibility Mean	Combined Mean
80	Manage riparian zone invasive species and restore these areas with native riparian plant communities	NYC DEP	4.07	3.42	7.49
64	Engage watercraft stewards in aquatic invasive species management	NYC DEP	3.50	3.77	7.27
19	Explore feasibility of standalone solar powered boat washing facilities for anglers and boaters at high traffic waterways	NYC DEP	3.43	3.82	7.25
7	Mount a coordinated Spotted Lanternfly rapid response	NYC DEP	3.71	3.45	7.16
30	Support riparian restoration programs through invasive plant suppression (knotweed)	NYC DEP	3.81	3.30	7.12
32	Assess threats to riparian forest overstory that maintain channel morphology and the presence of likely replacement species	NYC DEP	3.80	3.30	7.10
59	Improve invasive species prevention infrastructure and inspection steward staffing and capacity at public boat launches	NYC DEP	3.62	3.47	7.09
9	Actively monitor areas where spotted lantern fly has established in CRISP and Hudson Valley, and is likely to, and mitigate tree canopy loss (also applies to areas hit by emerald ash borer).	NYC DEP	3.87	3.12	6.99
15	Increase pesticide application capacity for rapid responses	NYC DEP	3.36	3.63	6.99
52	Create an eDNA program for the Catskills to regularly survey throughout the region for invasive fish and aquatic plants as the technology matures	NYC DEP	3.75	3.18	6.94
5	Assess impacts of beech leaf disease and support identifying strategies to mitigate the impacts in the Catskills and potential loss of beech	NYC DEP	3.40	3.50	6.90
69	Conduct a survey of high erosion sites in Catskill streams to assess invasive species impacts on erosion rates in Catskill aquatic systems	NYC DEP	3.52	3.27	6.79
35	Repopulate native brook trout instead of annual stocking with non-native trout species	NYC DEP	3.41	3.31	6.72
47	Provide funding/reimbursement for landowners treating hemlocks that are a critical part of restoring or maintaining their riparian buffer	NYC DEP	3.48	3.18	6.66
8	Introduction of Eriophyid mites as a biological control of tree of heaven in order to slow the spread of the spotted lantern fly,	NYC DEP	3.28	3.15	6.43
74	Assess water quality impacts associated with each invasive species	NYC DEP	3.52	2.82	6.34

29	Treat Japanese knotweed in headwaters and systematically work downstream	NYC DEP	3.38	2.91	6.28
81	Eradicate the hydrilla in New Croton Reservoir	NYC DEP	3.55	2.69	6.23
25	Limit the spread of snakehead within the Delaware River watershed	NYC DEP	3.70	2.42	6.13
26	Incentivise Japanese knotweed utilization	NYC DEP	2.46	2.76	5.23
18	Create a BMP training program for municipal highway departments and landscapers to minimize introduction and spread of invasives	NYS DEC	4.29	4.24	8.52
61	Collaborate with the NY Hemlock Initiative on the release of hemlock woolly adelgid biocontrol agents and their efficacy	NYS DEC	4.02	4.23	8.24
41	Work with DEC Region 3 and 4 permit staff to make sure that invasive species issues (SLF transport quarantines, clean equipment, native plant lists etc.) are flagged in permit reviews.	NYS DEC	4.09	3.97	8.06
60	Maintain an active list of licensed pesticide applicator businesses with expertise at invasive plant removal for partners	NYS DEC	3.71	4.21	7.92
78	Manage invasive plants that influence human health such as giant hogweed	NYS DEC	3.80	3.82	7.62
46	Create a strategic plan to deal with future hemlock loss	NYS DEC	3.79	3.79	7.58
31	Continue to protect hemlock forests	NYS DEC	3.98	3.45	7.44
2	Facilitate expanded rapid response by providing funds for groups/organizations that can coordinate local response	NYS DEC	3.88	3.48	7.36
63	Create a program to collect existing data and prioritize lakes for surveying, monitoring, and control efforts	NYS DEC	3.58	3.73	7.31
85	Use continuing education credits as a tool to promote early detection species education among professionals working across the landscape.	NYS DEC	3.52	3.79	7.31
53	Work with county soil and water conservation districts on native plant sales, offering a free native replacement for any invasive plants removed	NYS DEC	3.71	3.45	7.17
57	Create an annual campground and lake survey program for new introductions	NYS DEC	3.50	3.64	7.14
28	Identify a suitable facility for invasive species or invasive-contaminated soil disposal	NYS DEC	3.52	3.61	7.12
48	Identify potential resistant hemlock trees	NYS DEC	3.76	3.27	7.03
71	Track the spread of invasive forest insect pests	NYS DEC	3.78	3.20	6.98
40	Provide funding to train certified applicators to safely control target invasive species	NYS DEC	3.52	3.41	6.93
33	Advocate for State budget line to provide hemlock woolly adelgid and emerald ash borer treatment certification free or low cost to arborists	NYS DEC	3.32	3.52	6.84

38	Strategically incorporate climate change impacts and carbon sequestration into all management decisions	NYS DEC	3.62	3.15	6.77
75	Identify initial source(s) of invasives and pathways to Catskills	NYS DEC	3.62	3.06	6.68
24	Prevent introduction of new forest pests and pathogens including advocating for federal action	NYS DEC	3.96	2.67	6.63
17	Increased access to treatment for pests like Hemlock Woolly Adelgid and Emerald Ash Borers for private landowners, including providing funding	NYS DEC	3.42	3.15	6.57
34	Create an adoption program for state lands for people to support invasive pest management, either financially or through volunteer work (Adopt a hemlock grove or a knotweed stand, for example)	NYS DEC	3.33	3.12	6.45
49	Obtain alternative funding to build up capacity beyond the NYS EPF funding for CRISP to provide resilience in case of future contract gaps	NYS DEC	3.48	2.94	6.42
76	Track the spread of emerald ash borer	NYS DEC	2.95	2.97	5.92
10	Actively monitor areas where EAB has established/is likely to and mitigate tree canopy loss	NYS DEC	2.89	2.97	5.86
42	Collaborate with neighboring PRISMs to manage species that may be moving in from the border areas	CRISP	4.33	4.00	8.33
36	Increase management capacity through training students, citizen scientists, volunteers, landowners, and forest owners	CRISP	4.11	4.03	8.14
1	Increase capacity to perform early detection and rapid response	CRISP	4.38	3.73	8.11
86	Create a quick and easy way for landowners/stakeholders to ask questions and get answers and feedback to specific invasive species management topics via the web page	CRISP	3.98	4.09	8.07
43	Work with local governments to build invasive species prevention and management into their planning and review processes	CRISP	4.36	3.67	8.02
87	Finalize an invasive species management and monitoring protocol	CRISP	3.91	4.09	8.00
4	Prioritize mitigation of threats to Catskills ecosystems and forest ecosystem processes (i.e. forest regeneration)	CRISP	4.09	3.91	8.00
12	Increase outreach on spread prevention to Catskill recreationists and tourists	CRISP	3.86	4.09	7.95
16	Investigate and implement the most effective education and outreach strategies	CRISP	3.98	3.94	7.92
39	Coordinate with local colleges and universities to investigate research needs and facilitate invasive species field learning labs/volunteer days for students in environmental fields	CRISP	3.89	4.00	7.89

58	Develop/adopt best management practices for spread prevention on construction equipment and fill following the SLELO PRISM model	CRISP	3.95	3.94	7.89
82	Coordinate activities between partners so there is minimal redundancy in management strategies to maximize the funding available for specific monitoring and research proposals	CRISP	4.15	3.73	7.88
67	Develop uniform approaches to data collection by field crews	CRISP	3.88	3.97	7.84
51	Develop the next generation of invasive species professionals through meaningful internships that provide hands on experience in the Catskills	CRISP	3.85	3.91	7.76
72	Develop a procedure for objectively ranking invasives in order to triage the limited resources	CRISP	3.82	3.91	7.73
27	Build capacity to perform site restoration at treatment sites and provide resources to partners for restoration	CRISP	4.04	3.66	7.69
14	Identify and manage Invasive Species Prevention Zones based on low current invasion and critical habitats	CRISP	3.89	3.79	7.68
66	Advocate for prioritizing and funding treatment strategies for known infestations	CRISP	3.78	3.68	7.46
77	Promote use of boot brushes, cleaning of ATVs/vehicles, shoes, etc.	CRISP	3.42	4.03	7.45
3	Build Catskills specific citizen science program, adaptable to a wide audience (include college ecology programs), to provide information to volunteers and critical data to researchers, land managers, and agencies	CRISP	3.80	3.61	7.41
20	Provide BMP training and demonstrations for management of Tier 3 & 4 species	CRISP	3.48	3.91	7.39
54	Create a clearinghouse for information on available biological control organisms for partners	CRISP	3.41	3.97	7.38
55	Create a simple flow-chart based graphic for actions based on the detection of species from each tier as public facing tool to manage expectations on PRISM response and landowner responsibilities	CRISP	3.24	4.06	7.30
45	Survey around nurseries, arboretums, and formal gardens for invasive ornamental escapes	CRISP	3.38	3.91	7.29
84	Provide specific models/examples of communities that have successfully organized campaigns across multiple organizations and stakeholders to manage invasive species in their area	CRISP	3.26	3.94	7.20
22	Streamline data streams (citizen, agency, academics) and dissemination for use in outreach, management, and research	CRISP	3.53	3.44	6.97
21	Create a "teaching trail" for public education and to showcase management	CRISP	3.07	3.85	6.92

37	Focus on important goals/outcomes and how IS management supports those goals/outcomes, not on invasive species per se.	CRISP	3.24	3.61	6.85
6	Increase Jumping Worm mitigation and outreach, adapting program according to new research and successful strategies from other programs	CRISP	3.33	3.03	6.36
23	Prioritize European Frogbit for Early Detection and Rapid Response	CRISP	3.02	3.16	6.18
70	Assess the success of management projects	ALL	4.22	3.86	8.08
62	Focus on early detection of aquatic invasive species	ALL	3.98	3.64	7.62
65	Research & compare the range of methods available for reducing invasive annual plants (mile-a-minute, stiltgrass)	ALL	3.69	3.63	7.32
79	Collaborate to use plant species and water quality data to identify Invasive Species Prevention Zones	ALL	3.67	3.62	7.29
88	Develop early detection tools (possibly remote sensing) to better understand the spatial extent of invasive species of concern and the ecological impacts they might be having	ALL	3.79	3.18	6.97
83	Map areas of native plants that could provide regional seed stock for revegetation for post-control restoration efforts	ALL	3.53	3.44	6.97
73	Prevent aquatic invasive species spread	ALL	4.14	2.71	6.84
68	Determine what data can easily be collected in the field to validate remote sensing imagery for the purposes of invasive species detection	ALL	3.31	3.47	6.79
11	Treat and remove tree of heaven in satellite populations and introduce Eriophyid mites as biocontrol	ALL	3.23	3.32	6.55
56	Conduct an assessment of trailheads and determine the best locations for boot brush stations	ALL	2.93	3.61	6.53
50	Tackle invasive species that host ticks in high traffic areas in order to prevent the spread of invasives to other areas and also prevent tick borne illness	ALL	3.29	2.68	5.96
13	Consider management of Jumping Worms based on their synergistic impacts with other invasives and soils	ALL	3.13	2.65	5.77
44	Eradicate water chestnut from the region	ALL	2.81	2.00	4.81