

Researchers have suggested that modern climate change may profoundly influence biodiversity including species extinction and impacts on natural resource management. One management technique for aiding biodiversity under climate change is managed relocation, the deliberate introduction of organisms outside of their native ranges to counteract the negative effects of climate change. The idea has also been called “assisted migration” or “assisted colonization.”

This survey aims to gauge professional opinion on the positive and negative consequences of managed relocation. Based on your publication record, we are very interested in your opinion. **We are contacting only scholars such as you who have published in the top quartile of environmental science journals in the last ten years.** We would be grateful for your participation.

All responses will be treated with the utmost *confidentiality and reported only in aggregate form.*

At the end of the survey, there will be an opportunity for you to provide your email address so that you can receive information about the results of this survey. If you elect to supply your email address, it will not be associated with your other responses. Please visit our website <http://www.nd.edu/~javeline/MRSurvey/> for additional information and updates on our research.

Participation in this survey is voluntary and you are free to stop completing the questionnaire anytime. The decision to participate, decline, or withdraw from participation will have no effect on your status at or future relations with the University of Notre Dame. There are no known risks associated with participating in this study.

To protect the confidentiality of your responses, the Survey Research Laboratory (SRL) at the University of Illinois is managing the administration of this survey. SRL will not provide us with any personal, identifying information.

If you have any questions about this survey, please contact Jennifer Parsons at (312) 413-0216 or via email at NDSMR@srl.uic.edu. You can also contact us; details are below. If you have any concerns about the study or questions about your rights as a research participant, you can contact Tracey Poston, Director of Research Compliance, University of Notre Dame, via phone at 574-631-1461 or via email at Tracey.L.Poston.2@nd.edu.

Thank you for your participation in this study!!

Sincerely,

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I have read and understood the consent document above and voluntarily agree to complete the survey. Click the “print” button on the browser if you would like to print this document for your records. (Please click on “Managed Relocation Survey” below to provide consent and to get to the survey.)

[Managed Relocation Survey](#)

After you have answered all the questions on a screen, please click “**Next**” to save your answers and move to the next screen. To leave a question blank, click “**Next**” a second time. If you would like to return to a previous screen to change any of your previous answers, please click “**Back**.” If you leave the survey and return to complete it at a later time, please click “**Resume where I left off**.” When you reach the end of the questionnaire, please click “**Submit**” to save responses in the database.

The survey is composed of six sections:

- Your professional demographics
- Your expert opinion on
 - climate change
 - biotic responses to climate change
 - invasive species
 - managed relocation
- Your personal demographics

[Begin Survey]

Please answer the following questions about yourself.

Q1. Which best describes your profession? Choose **one** profession.

1. professor at teaching college/university
2. professor at research university
3. postdoctoral researcher
4. student
5. employee of state resource agency
6. employee of federal resource agency

- 7. employee of non-government agency (NGO)
- 8. other (please specify. _____)

Q1A. [IF CHOOSE #5, 6, or 7 FOR Q1] Do you devote the majority of your time to:

- 1. research
- 2. resource management
- 3. policymaking
- 4. policy implementation
- 5. other: _____

Q2. What is your highest degree? Choose **one** degree.

- 1. none
- 2. high school
- 3. Bachelor's
- 4. Master's
- 5. Ph.D.
- 6. other (e.g., JD) _____

[FOR THOSE WITH DEGREE ONLY]

Q2A. In what year did you earn your highest degree?

Q3. Gender: F M

Q4. In which country do you primarily reside? [WEB PROGRAMMER: USE STANDARD PULLDOWN MENU FOR COUNTRIES.]

[FOR U.S. RESPONDENTS ONLY]

Q4A. In which state do you live? [WEB PROGRAMMER: USE STANDARD PULLDOWN MENU FOR U.S. STATES.]

Q5. Which of the following **best** characterizes your area of expertise?

- 1. ecology
- 2. evolutionary biology
- 3. conservation biology

Q6. Which of the following **best** characterizes the biological level of your expertise?

- 1. organisms
- 2. populations
- 3. communities
- 4. ecosystems
- 5. my expertise is not biological [please specify _____]

Q7. In what location(s) does your primary research take place? Choose **up to two** locations.

1. North America
2. South America
3. Africa
4. Asia
5. Europe
6. Australia
7. Antarctica
8. global
9. islands
10. oceans

Q8. At what latitude(s) does your primary research take place? Choose **up to two** latitudes.
[WEB PROGRAMMER: INCLUDE MAP WITH LATITUDE LINES]

1. high latitude (>60 degrees)
2. temperate latitudes (30-60 degrees)
3. tropical/subtropical latitudes (<30 degrees)
4. global

Q9. With what group(s) of organisms do you work most closely? Choose **up to two** groups. [WEB PROGRAMMER: USE APPROPRIATE SKIP PATTERNS FOR THOSE WORKING WITH PLANTS AND/OR ANIMALS]

1. plants
2. animals
3. fungi
4. microorganisms
5. none (e.g. biogeochemist, theorist)

[FOR THOSE WORKING WITH PLANTS]

Q9A. With what group of plants do you work most closely? Choose all that apply.

1. woody plants
2. perennial plants
3. annual plants

[FOR THOSE WORKING WITH ANIMALS]

Q9B. With what group of animals do you work most closely? Choose **up to three** animal groups.

1. birds
2. amphibians
3. mammals
4. fish
5. reptiles
6. freshwater invertebrates
7. marine invertebrates
8. spiders
9. insect vectors of disease

10. beetles
11. butterflies and/or moths
12. ants, bees, and/or wasps
13. other terrestrial invertebrate
14. other (please specify class or order): _____

Q10. Of the organisms with which you work most closely, how many would you say are important for commerce or industry?

1. all
2. more than half
3. approximately half
4. fewer than half
5. none

Q11. In what ecosystem(s) do you primarily work? Choose **up to two** systems.

1. lakes
2. streams
3. grasslands
4. shrublands
5. forests
6. riparian zones
7. wetlands
8. open ocean
9. intertidal
10. ocean shelves/estuaries/coastal
11. reefs
12. island(s)
13. agricultural
14. urban/suburban
13. other (please specify): _____

Now we are going to ask your opinion about climate change. We acknowledge that some of the questions below involve considerable uncertainty, and we are interested in your best guess given this uncertainty. In several instances, you will be asked for a guess and then asked how sure you are about that guess. For some of the questions, you might feel that your answer is conditional on factors not mentioned in the question. In such cases, **please answer the question to the best of your ability without skipping**, and at the end of the survey we provide an opportunity for you to express your concerns.

Q12. In your opinion, within the *next 100 years*, how likely is it that the earth's average temperature will increase?

1. not at all likely
2. not very likely
3. rather likely
4. very likely

[FOR THOSE WHO ANSWER “RATHER LIKELY” OR “VERY LIKELY”]
 If you think that the earth is warming, what is your *overall best guess* for the number of degrees Celsius that the earth’s average temperature will increase in 100 years, and what is your best guess for the *likely minimum* number of degrees and *likely maximum* number of degrees? What level of certainty do you have about your best overall guess, likely minimum, and likely maximum --are you very certain, somewhat certain, not very certain, or not at all certain?
Decimals allowed.

	Q13. °C	Q14.			
		1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
A. Best overall guess for increase					
B. Likely minimum increase					
C. Likely maximum increase					

Q15. Not everyone is aware of the recorded amount of recent temperature change. What is your best guess of the **recorded** change in the earth’s average temperature during the **last 100 years**? **Decimals allowed.**
 _____ °C

Q16. Compared to the last deglaciation, how much **greater or less in magnitude** do you expect human-caused climate change to be in the next 100 years? Will human-caused climate change be...?
 1. *much greater* than the last deglaciation
 2. *somewhat greater* than the last deglaciation
 3. *about the same* as the last deglaciation
 4. *somewhat less* than the last deglaciation
 5. *much less* than the last deglaciation

Q17. Compared to the last deglaciation, how much **faster or slower** do you expect human-caused climate change to be in the next 100 years? Will human-caused climate change be...?
 1. *much faster* than the last deglaciation
 2. *somewhat faster* than the last deglaciation
 3. *about the same* as the last deglaciation
 4. *somewhat slower* than the last deglaciation
 5. *much slower* than the last deglaciation

Now that we have queried you about climate change, we would like to know how much you think climate change will affect biodiversity. We know that the biological impacts of climate change are still uncertain and often system-specific. Therefore, we ask that you provide the **best overall guess** to the questions below. We are interested in the

mean and variation provided by experts on these difficult questions. There is an opportunity at the end of the survey to discuss which of your answers are conditional on factors not mentioned in the question.

In your opinion, what percentage of non-microbial species will be committed to extinction **solely due to climate change in the absence of other causes** within the *next 100 years*? How certain are you about this estimate?

Q18. Q19.

	%	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
Species extinction solely due to climate change within next 100 years					

In your opinion, what percentage of non-microbial species will be committed to extinction **due to a combined effect of climate change and other causes** within the *next 100 years*? How certain are you about this estimate?

Q20. Q21.

	%	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
Species extinction due to combined effect of climate change and other causes within next 100 years					

Overall, in your opinion, what percentage of non-microbial species might otherwise be threatened by climate change but will escape extinction by evolutionary adaptation? How certain are you about this estimate?

Q22. Q23.

	%	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
Species threatened by climate change but will escape extinction by evolutionary adaptation					

For those non-microbial species that do not go extinct under climate change, what percentage of them do you think will have altered geographic ranges caused by climate change in 100 years? How certain are you about this estimate?

Q24. Q25.

	%	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
Species will have altered geographic ranges caused					

by climate change in 100 years					
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In your opinion, what percentage of non-microbial species have populations that are locally adapted (i.e., perform best under their natal conditions)? How certain are you about this estimate?

	Q26.	Q27.			
	%	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
Species have populations that are locally adapted					

Q28. In your opinion, which of the following factors are most significant in increasing the risk of species extinction due to climate change? *Choose up to three factors.*

- A. rarity of species
- B. dispersal capacity of species
- C. range size of species
- D. population growth rate of species
- E. plasticity of species
- F. generation time of species
- G. species is a top predator
- H. species is a primary producer
- I. species is endemic to island(s)
- J. species occurs at high elevation
- K. species lives in tropical areas
- L. species lives in temperate areas
- M. species lives in boreal areas
- N. species associates with humans
- O. species is highly specialized

Q29. Which range below best represents the most common published estimate of the percentage of species that will be at risk of extinction due to climate change?

- 1. Less than 15%
- 2. 15% to 40%
- 3. More than 40%

The following questions ask you for your expert opinion about the causes and consequences of non-native species. Again, some of these questions involve considerable uncertainty, but we ask that you provide your **best guess**. In some instances, the answer may vary among types of organisms and ecosystems, but we ask you to judge **overall** based on your knowledge and experience. There is an opportunity at the end of the survey to discuss which of your answers are conditional.

In your opinion, what percentage of non-native species, once established, have serious negative impacts on native taxa? How certain are you about this estimate?

Q30. Q31.

	%	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
Non-native species have serious negative impacts on native taxa					

The following table lists a number of potential consequences of non-native species in their introduced range. Thinking of non-natives overall, what percentage of non-native species do you think cause each consequence?

Q32.

	% of non-native species
A. diminished ecosystem function	
B. species extinction	
C. aesthetic damage	
D. economic costs	
E. loss of genetic diversity among native species	

Q33. Thinking of the consequences caused by non-native species overall, **how detrimental** do you think such consequences are?

	1. very detrimental	2. somewhat detrimental	3. not very detrimental	4. not at all detrimental
A. diminished ecosystem function				
B. species extinction				
C. aesthetic damage				
D. economic costs				
E. loss of genetic diversity among native species				

Compared to [FOR ACADEMICS: other people who publish in the top quartile of environmental science journals/FOR RESOURCE MANAGERS: other employees at public and private management agencies], how would you rate your level of knowledge about ...?

	1. excellent	2. very good	3. good	4. fair	5. poor
Q34. climate change					
Q35. biotic responses to climate change					
Q36. invasive species					

Q37. How many of your publications to date (single or multiple authors) address each topic below? (If you have publications, please enter a number for each category below. If you have no publications for a particular category, please enter 0.)

___ My job does not involve publishing.

	# of publications
A. climate change	
B. biotic responses to climate change	
C. invasive species	

[FOR RESOURCE MANAGERS ONLY]

What fraction of your time at work do you spend ...?

	Q38. projecting or measuring climatic changes (e.g. temperature, precipitation)	Q39. managing or studying the biotic effects of climate change	Q40. managing or studying invasive species
1. none			
2. less than a quarter			
3. a quarter to a half			
4. half or more			

In the following section, we ask you some questions about managed relocation and your estimation of its potential advantages and disadvantages. Though the ideas underlying managed relocation have been studied for decades, there is considerable uncertainty about the potential utility of managed relocation as a strategy for aiding biodiversity under climate change. As in the sections before, we ask that you provide your **best guess** in the face of this uncertainty so that the expert opinion of you and your colleagues can guide future research and policy on this issue. There is an opportunity at the end of the survey to discuss which of your answers are conditional.

Recall that our definition of managed relocation is the deliberate introduction of organisms outside of their native ranges to counteract the negative effects of climate change.

Managed relocation may achieve its target objectives, yet managed relocation may also have unintended consequences in the introduced region.

Q41. For each target objective listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has the possible unintended consequence of putting non-target species at risk of extinction.**

	1. justifiable	2. not justifiable
A. to prevent species extinction		
B. to prevent loss of unique genotypes or ecotypes		
C. to preserve or enable ecosystem function		

Q42. For each target objective listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has the possible unintended consequence of impairing ecosystem services.**

	1. justifiable	2. not justifiable
A. to prevent species extinction		
B. to prevent loss of unique genotypes or ecotypes		

Q43. For each target objective listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it is unlikely to cause any ecological harm.**

	1. justifiable	2. not justifiable
A. to prevent species extinction		
B. to prevent loss of unique genotypes or ecotypes		
C. to preserve or enable ecosystem function		

Q44. For each target objective listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has unknown consequences.**

	1. justifiable	2. not justifiable
A. to prevent species extinction		
B. to prevent loss of unique genotypes or ecotypes		
C. to preserve or enable ecosystem function		

There may be different information requirements for pursuing managed relocation.

Q45. For each information requirement listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has the possible unintended consequence of putting non-target species at risk of extinction.**

	1. justifiable	2. not justifiable
A. Specific scientific data indicates that the action would prevent extinction of the target species		
B. Broad consensus among experts is that the action would prevent extinction of the target species		
C Stakeholders strongly argue that the action would prevent extinction of the target species		

Q46. For each information requirement listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it is unlikely to cause any ecological harm.**

	1. justifiable	2. not justifiable
A. Specific scientific data indicates that the action would prevent extinction of the target species		
B. Broad consensus among experts is that the action would prevent extinction of the target species		
C Stakeholders strongly argue that the action		

would prevent extinction of the target species		
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Q47. For each information requirement listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has unknown consequences.**

	1. justifiable	2. not justifiable
A. Specific scientific data indicates that the action would prevent extinction of the target species		
B. Broad consensus among experts is that the action would prevent extinction of the target species		
C Stakeholders strongly argue that the action would prevent extinction of the target species		

Managed relocation may be motivated by the need to overcome different barriers to a species' dispersal.

Q48. For each motivation listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has the possible unintended consequence of putting non-target species at risk of extinction.**

	1. justifiable	2. not justifiable
A. to overcome a natural dispersal barrier, like a river or mountain range		
B. to overcome a human-made barrier, like an urban or agricultural region		
C. to overcome its own limited speed of dispersal		

Q49. For each motivation listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it is unlikely to cause any ecological harm.**

	1. justifiable	2. not justifiable
A. to overcome a natural dispersal barrier, like a river or mountain range		
B. to overcome a human-made barrier, like an urban or agricultural region		
C. to overcome its own limited speed of dispersal		

Q50. For each motivation listed in the table below, please indicate whether you think managed relocation is justifiable or not **if it has unknown consequences.**

	1. justifiable	2. not justifiable
A. to overcome a natural dispersal barrier, like a river or mountain range		
B. to overcome a human-made barrier, like an urban or agricultural region		
C. to overcome its own limited speed of dispersal		

Q51. In your opinion, for each taxonomic group below, how likely is it that managed relocation of a single species to multiple locales will **put non-target species at risk of extinction**?

	1. very likely	2. somewhat likely	3. not very likely	4. not at all likely
A. herbaceous plants				
B. woody plants				
C. birds				
D. large mammals				
E. small mammals				
F. reptiles				
G. amphibians				
H. insects				
I. other terrestrial invertebrates				
J. freshwater invertebrates				
K. marine invertebrates				
L. micro organisms				
M. pathogens				

Q52. In your opinion, for each taxonomic group below, how likely is it that managed relocation of a single species to multiple locales will **impair ecosystem services**?

	1. very likely	2. somewhat likely	3. not very likely	4. not at all likely
A. herbaceous plants				
B. woody plants				
C. birds				
D. large mammals				
E. small mammals				
F. reptiles				
G. amphibians				
H. insects				
I. other terrestrial invertebrates				
J. freshwater invertebrates				
K. marine invertebrates				
L. micro organisms				
M. pathogens				

Q53. In your opinion, for each taxonomic group below, how likely is it that managed relocation of a single species to multiple locales will **cause loss of unique genotypes**?

	1. very likely	2. somewhat likely	3. not very likely	4. not at all likely
A. herbaceous plants				
B. woody plants				

C. birds				
D. large mammals				
E. small mammals				
F. reptiles				
G. amphibians				
H. insects				
I. other terrestrial invertebrates				
J. freshwater invertebrates				
K. marine invertebrates				
L. micro organisms				
M. pathogens				

Q54. The following table lists a number of potential consequences of managed relocation for non-target organisms. Of managed relocation programs that are likely to be pursued, on average, **how extensive** do you think such consequences will be?

	1. very extensive	2. somewhat extensive	3. not very extensive	4. not at all extensive
A. diminished ecosystem function				
B. species extinction				
C. aesthetic damage				
D. economic costs				
E. loss of genetic diversity among native species				

Q55. The following table lists a number of potential consequences of managed relocation for non-target organisms. Of managed relocation programs that are likely to be pursued, on average, **how detrimental** do you think such consequences will be?

	1. very detrimental	2. somewhat detrimental	3. not very detrimental	4. not at all detrimental
A. diminished ecosystem function				
B. species extinction				
C. aesthetic damage				
D. economic costs				
E. loss of genetic diversity among native species				

Q56. In the case of a species that is immediately threatened with extinction by climate change, which is most **preferable**, no intervention, expand protected areas, establish corridors, managed relocation, or *ex situ* conservation site (e.g., preservation in a zoo, seed bank, or botanic garden)?

1. no intervention

2. expand protected areas
3. establish corridors
4. managed relocation
5. *ex situ* conservation (e.g., preservation in a zoo, seed bank, or botanic garden)

Q57. In the case of a species that is immediately threatened with extinction by climate change, which is most **feasible**?

1. no intervention
2. expand protected areas
3. establish corridors
4. managed relocation
5. *ex situ* conservation (e.g., preservation in a zoo, seed bank, or botanic garden)

Q58. How supportive are you about managed relocation overall as a strategy for preserving biodiversity under climate change?

1. very supportive
2. somewhat supportive
3. not very supportive
4. not at all supportive

The following questions ask for your opinion about possible strategies for and limitations on the implementation managed relocation.

Q59. If populations are historically isolated and genetically distinct, how important do you think it should be to maintain that distinction when pursuing a managed relocation program?

1. very important
2. somewhat important
3. not very important
4. not at all important

Q60. If populations are historically isolated and genetically distinct, how important do you think it should be to pool these populations to maximize genetic diversity when pursuing an managed relocation program?

1. very important
2. somewhat important
3. not very important
4. not at all important

In a previous question, you named [WEB PROGRAMMER: IF RESPONSE TO Q9 IS “1,” USE THE PLANT GROUPS NAMED IN Q9A; IF RESPONSE TO Q9 IS “2,” USE ANIMAL GROUPS NAMED IN Q9B; IF RESPONSE TO Q9 IS “3,” USE “FUNGI”; IF RESPONSE TO Q9 IS “4,” USE “MICROORGANISMS”; IF RESPONSE TO Q9 IS “5,” QUESTION CAN BE SKIPPED. RESPONDENTS COULD THEREFORE HAVE MINIMUM OF 0 AND MAXIMUM OF 6 GROUPS] as groups of organisms with which you work most closely. Consider a managed relocation program to enable poleward (or

upward) range expansion of a species in each group under climate change. In your view, how effective do you think that the introduction of a *single* population would be in achieving this goal? How certain are you about this estimate?

Q61.

Q62.

	1. very effective	2. somewhat effective	3. not very effective	4. not at all effective	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
A. managed relocation for species of [WEB PROGRAMMER: USE FIRST GROUP]								
B. managed relocation for species of [WEB PROGRAMMER: USE SECOND GROUP]								
C. managed relocation for species of [WEB PROGRAMMER: USE THIRD GROUP]								
D. managed relocation for species of [WEB PROGRAMMER: USE FOURTH GROUP]								
E. managed relocation for species of [WEB PROGRAMMER: USE FIFTH GROUP]								
F. managed relocation for species of [WEB PROGRAMMER: USE SIXTH GROUP]								

Q63. Of the following possible goals of a managed relocation, should each be very high priority, somewhat high priority, not high priority or not a priority at all?

	1. very high priority	2. somewhat high priority	3. not high priority	4. not a priority at all
A. conservation of threatened species				
B. conservation of threatened genotypes				
C. maximize community diversity, e.g. species richness				
D. maximize productivity of economically valuable species, e.g. timber production				
E. enable or preserve ecosystem services, e.g. water purification				
F. maximize aesthetic value				

Below we briefly describe **three cases of actual or proposed managed relocation projects**, and we ask you to assess the potential costs, benefits, feasibility, and constraints of such endeavors.

Case #1. Ontario law mandates that timber clear-cuts must be restocked with local seed because provenance tests show that trees from local stock perform better. Some foresters have challenged the utility of this policy under climate change and suggest that timber production would benefit if clear cuts were widely restocked with genotypes or species from farther south (potentially, even with species currently rare in Canada such as yellow poplar (*Liriodendron tulipifera*)).

In the Ontario example, how effective would managed relocation for forest replanting be in achieving gains in timber production under climate change? How certain are you about this estimate?

	Q64.				Q65.			
	1. very effective	2. somewhat effective	3. not very effective	4. not at all effective	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
managed relocation for forest replanting in Ontario								

Q66. In the Ontario example, how beneficial or detrimental do you think that the ecological impacts associated with managed relocation for forest replanting would be?

1. very beneficial
2. somewhat beneficial
3. equally beneficial and detrimental
4. somewhat detrimental
5. very detrimental
6. no detectable impact

Q67. How justifiable do you think that the ecological impacts of managed relocation for forest replanting in the case of Ontario are? Do you think that the costs are very justifiable, somewhat justifiable, not very justifiable, or not at all justifiable?

1. very justifiable
2. somewhat justifiable
3. not very justifiable
4. not at all justifiable

Q68. How supportive would you be of pursuing managed relocation in the case of forest replanting in Ontario? Would you be very supportive, somewhat supportive, not very supportive, or not at all supportive?

1. very supportive
2. somewhat supportive
3. not very supportive
4. not at all supportive

Q69. For the purpose of forest restocking in the case of Ontario, do you think that regulations should be imposed on...

	1. no regulation is necessary	2. self-directed guidelines should be in place	3. guidelines developed by a natural resource agency should be in place	4. legally binding regulations should be imposed
A. establishing forest tree species outside their historical distribution				
B. restocking non-local seed (genotypes) of native species				

Case #2. Mitchell’s satyr (*Neonympha mitchellii mitchellii*) is a federally endangered subspecies of butterfly found in less than two-dozen peatlands in Michigan and northern Indiana. Members of a national conservation organization have discussed the possibility of introducing “experimental populations” of this species in a peatland just outside of its native range in order to test ideas about how to perform and monitor a managed relocation introduction. Such managed relocation would be pursued to reduce the threat of extinction for this species. Assume that this activity is legal, for example, under the experimental population provision of the Endangered Species Act.

In your opinion, how effective would managed relocation for Mitchell’s satyr be in reducing the threat of subspecies’ extinction? How certain are you about this estimate?

Q70.

Q71.

	1. very effective	2. somewhat effective	3. not very effective	4. not at all effective	1. very certain	2. somewhat certain	3. not very certain	4. not at all certain
managed relocation for Mitchell’s satyr								

Q72. In your opinion, do you think that that the ecological impacts associated with managed relocation of Mitchell’s satyr would be very beneficial, somewhat beneficial, no detectable impact, somewhat detrimental, or very detrimental?

1. very beneficial
2. somewhat beneficial
3. equally beneficial and detrimental
4. somewhat detrimental
5. very detrimental
6. no detectable impact

Q73. How justifiable do you think the ecological impacts of managed relocation for Mitchell’s satyr are? Do you think that the impacts are very justifiable, somewhat justifiable, not very justifiable, or not at all justifiable?

1. very justifiable

2. somewhat justifiable
3. not very justifiable
4. not at all justifiable

Q74. In the case of Mitchell’s satyr, how supportive would you be of pursuing managed relocation as described above? Would you be very supportive, somewhat supportive, not very supportive, or not at all supportive?

1. very supportive
2. somewhat supportive
3. not very supportive
4. not at all supportive

Q75. Which of the following regulations, if any, do you think should be imposed on the managed relocation of Mitchell’s satyr?

1. no regulation necessary
2. self-directed guidelines should be in place
3. guidelines developed by a natural resource agency should be in place
4. legally binding regulations should be imposed

Case #3. A 2008 *Science* article suggested that managed relocation could be pursued for **Zooxanthellae** in the oceans in order to save coral reefs. Zooxanthellae are the algal symbionts that provide coral with up to 90% of their energy. When water temperatures become too warm, zooxanthellae die and drive coral bleaching. The proposal is to relocate zooxanthellae found in warm waters (closer to the equator) to points further north, with the hope that these warm-adapted zooxanthellae will be incorporated into temperate corals and buffer these corals from the impacts of warming waters.

In your opinion, how effective would managed relocation for Zooxanthellae be in reducing the threat of coral reef loss? How certain are you about this estimate?

	Q76.				Q77.			
	1. very effective	2. somewhat effective	3. not very effective	4. not at all effective	1. very certain	2. somewhat certain	3. not very certain	4. n cert
managed relocation for Zooxanthellae								

Q78. In your opinion, do you think that that the ecological impacts associated with managed relocation of Zooxanthellae would be very beneficial, somewhat beneficial, no detectable impact, somewhat detrimental, or very detrimental?

1. very beneficial
2. somewhat beneficial
3. equally beneficial and detrimental
4. somewhat detrimental
5. very detrimental
6. no detectable impact

Q79. How justifiable do you think the ecological impacts of managed relocation for Zooxanthellae are? Do you think that the impacts are very justifiable, somewhat justifiable, not very justifiable, or not at all justifiable?

1. very justifiable
2. somewhat justifiable
3. not very justifiable
4. not at all justifiable

Q80. In the case of Zooxanthellae, how supportive would you be of pursuing managed relocation as described above? Would you be very supportive, somewhat supportive, not very supportive, or not at all supportive?

1. very supportive
2. somewhat supportive
3. not very supportive
4. not at all supportive

Q81. Which of the following regulations, if any, do you think should be imposed on the managed relocation of Zooxanthellae?

1. no regulation necessary
2. self-directed guidelines should be in place
3. guidelines developed by a natural resource agency should be in place
4. legally binding regulations should be imposed

Scientists are a very diverse group. **We are interested to know your social, personal, and political perspective on several issues related to biodiversity conservation and management.** To gauge your life experience and current opinions, we ask you the following questions.

Q82. In general, how much interest do you have in political affairs -- a great deal, a fair amount, not very much, or no interest at all?

1. a great deal
2. a fair amount
3. not very much
4. no interest at all

Q83. In general, how much interest do you have in **environmental** political affairs -- a great deal, a fair amount, not very much, or no interest at all?

1. a great deal
2. a fair amount
3. not very much
4. no interest at all

Q84. Assuming that a managed location program was going to be pursued, would you prefer that such a program be run entirely by government agencies, mostly by government agencies, partly by government agencies and partly by the private sector, mostly by the private sector, or entirely by the private sector?

1. entirely by government agencies
2. mostly by government agencies
3. partly by government agencies and partly by the private sector
4. mostly by the private sector
5. entirely by the private sector

Q85. In cases where wilderness conservation comes into conflict with human pursuits, would you say that you...

1. Always value wilderness conservation
2. Mostly value wilderness conservation
3. Value wilderness conservation and human pursuits equally
4. Mostly value human pursuits
5. Always value human pursuits

Q86. Below are a number of values that shape some people's views about nature. To you, is each value very important, somewhat important, not very important, or not at all important?

	1. very important	2. somewhat important	3. not very important	4. not at all important
A. enjoying the beauty of nature				
B. protecting nature to ensure human well-being and survival				
C. protecting nature for moral or ethical reasons				
D. experiencing nature as our ancestors did				
E. studying nature for scientific purposes				
F. getting closer to G-d or obtaining other spiritual meaning through contact with nature				
G. getting timber, minerals, and other natural resources from nature				

Q87A. Did you attend the workshop on managed relocation that was held at the Annual Meeting of the Ecological Society of America on May 5, 2008? yes, no

B. Did you attend the symposium on managed relocation that was held at the Annual Meeting of the Ecological Society of America on August 5, 2009? yes, no

Q88. Have you previously read a **journal article** that directly addresses the topic of managed relocation?

1. yes
2. no

Q89. Have you previously read a **popular press article** that directly addresses the topic of managed relocation?

1. yes
2. no

Q90. How would you describe any previous thought you have given to the topic of managed relocation?

1. Never thought about managed relocation before this survey
2. Heard or read about managed relocation previously but did not give it serious thought
3. Heard or read about managed relocation enough to have considered the idea but did not form any opinions
4. Heard or read about it previously and formed weak opinions
5. Heard or read about it previously and formed strong opinions

We are interested in the opinion of the scientific community as a whole, independent of scientists' politics, religion, and income. We would therefore like to control for these personal positions and circumstances in analysis to see whether scientific views transcend them. For that reason, we would like to know:

Q91. On a scale from 0 to 100, what percent of the time do you think you can trust the federal government in Washington to do what is best for the country? [WEB DESIGNER: FOR NON-AMERICANS AS IDENTIFIED IN Q4, REPLACE "FEDERAL GOVERNMENT IN WASHINGTON" WITH "NATIONAL GOVERNMENT IN YOUR COUNTRY."]

_____%

Q92. On a scale from 0 to 100, what percent of the time do you think you can trust the government in [STATE NAMED IN Q4] to do what is best for [STATE NAMED IN Q4]? [WEB DESIGNER: FOR NON-AMERICANS AS IDENTIFIED IN Q4, REPLACE "GOVERNMENT IN STATE" WITH "YOUR LOCAL GOVERNMENT."]

_____%

[FOR U.S. RESPONDENTS AS IDENTIFIED IN Q4]

Q93. Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or something else?

1. Republican
2. Democrat

3. Independent
4. Other

IF REPUBLICAN OR DEMOCRAT:

- A. Would you call yourself a strong (REPUBLICAN/DEMOCRAT) or a not very strong (REPUBLICAN/DEMOCRAT)?
 1. strong
 2. not very strong

IF INDEPENDENT, OTHER OR NO PREFERENCE:

- B. Do you think of yourself as closer to the Republican or Democratic party?
 1. closer to Republican party
 2. closer to Democratic party

Q94. What is your religious preference?

1. Protestant
2. Catholic
3. Christian Orthodox
4. Jewish
5. Muslim
6. Hindu
7. Buddhist
8. other (specify) _____
9. No religion

Q95. Would you say G-d is something you believe in, something you are not sure about, or something you don't believe in? [GALLUP POLL 2007]

Q96. How important is religion in your life?

1. very important
2. somewhat important
3. not very important
4. not at all important

Q97. Aside from weddings and funerals, how often do you attend religious services? [PEW FORUM ON RELIGION AND PUBLIC LIFE SURVEY AUG. 2007]

1. more than once a week
2. once a week
3. once or twice a month
4. a few times a year
5. seldom
6. never

Q98. What was your total household income, before taxes, in 2008? Please include the income of all members of your household, and include salaries, wages, pensions, dividends, interest, and all other income.

1. Less than \$25,000
2. \$25,000-\$34,999
3. \$35,000-\$44,999
4. \$45,000-\$54,999
5. \$55,000-\$64,999
6. \$65,000-\$74,999
7. \$75,000-\$84,999
8. \$85,000-\$94,999
9. \$95,000-\$104,999
10. \$105,000-\$114,999
11. \$115,000-\$124,999
12. \$125,000 and over

You have now finished the survey on managed relocation. Thank you for very much for your time. Before you exit, we would greatly appreciate it if you could answer five open-ended questions that help us improve the survey and allow you to share further opinions about climate change and managed relocation. If you would prefer not to answer these questions, please choose "submit."

If you would like to answer these questions, please click on 'continue'.
[Continue]

If you would prefer not to answer these questions, please click on 'submit' to exit.
[Submit]

[For those that continue]

Thank you for your time and attention to this survey. Please use the space provided to give us additional feedback.

In this survey, we have asked you to provide your best estimate on topics that are highly uncertain and nuanced. For which particular questions or topic areas, if any, would you have preferred to answer "it depends"? Please be as specific as possible. [WEB PROGRAMMER: WOULD IT BE POSSIBLE TO PLACE THIS QUESTION IN MULTIPLE SECTIONS OF THE SURVEY SO THE RESPONDENT DOES NOT FORGET HIS/HER PRIOR THOUGHTS?]

What research objectives or hypotheses do you think are critical to address when evaluating managed relocation?

Under what specific situation do you think that managed relocation should be pursued?
(This could be an example scenario.)

Are there any topics or points of consideration that we have missed in this survey?

Are there any comments or suggestions that you would like to make?

If you would be interested in receiving information about the results of this survey, please write your email address below. This contact information will be stored separately from the answers that you provided so that your responses remain *confidential*.

Email address: _____