

Natural Resources Social Science Lab: Survey development, distribution, and management.

Prepared August 2023 by:

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The Natural Resources Social Science Lab studies how human interactions with the environment impact natural resources. Our research, teaching, and engagement activities focus on how to best motivate farmers, stakeholders, and citizens of all kinds to participate in more environmentally friendly behaviors and practices. For more information, please go to <https://www.purdue.edu/fnr/prokopy>

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1 Introduction

This document provides the procedures used in the Purdue University Department of Forestry and Natural Resources (FNR) Natural Resources Social Science (NRSS) Lab to manage a survey using a hardcopy and/or an online survey instrument. The protocols outlined in this document will demonstrate how to manage questions in an online software system (Qualtrics) and distribution techniques for online and hardcopy survey distribution. Additionally, this provides detail as to how to enter hardcopy questionnaire responses, how to conduct quality assurance checks and data cleaning. Note the following protocols do not provide the methodology or theoretical background as to how to develop questions but rather the mechanics to assure high quality data once questions are developed.

Two types of survey distributions are primarily conducted in the NRSS Lab; online only or hardcopy and online. (Note on rare occasion the target audience may only be suitable for a hardcopy only distribution. If this is the case follow all procedures that pertain to the hardcopy and online distribution but do not provide the online link to participants.) Online only surveys are typically conducted using email address or links provided by the Qualtrics software. Hardcopy and online survey distributions provide an online option to survey participants as well as a hardcopy questionnaire. All distribution techniques use the online survey software Qualtrics either for participant response or for data entry conducted by NRSS Lab personnel.

Prior to the survey instrument (henceforth referred to as the questionnaire) input into Qualtrics, the questionnaire needs to be developed and its contents must be reviewed and approved by the Principle Investigator (PI) (i.e., Dr. Prokopy). This questionnaire should be developed either in Microsoft Word for online only or a publisher file for hardcopy and online distribution. Additional details on these documents are provided in their respective sections.

The following broad guidelines apply to the NRSS Lab:

- Before beginning any of the tasks described below, read the entire section. If the project cannot comply with the protocol listed, contact the PI and the Lab Manager immediately. The PI must approve any deviations from the listed protocols.
- Note that a metadata file should be associated with all data files and track activities associated with the data, software version numbers, describing protocols, and specific examples. Make sure to include any deviations from the listed protocols.
- All file dates should be formatted as follows: "_YEARMMDD." Format requires eight digits, no letters or spaces, with the four digit year first (e.g., "_20200715").
- Never delete data from files. Note that we store our data on secure servers and all NRSS Lab members should be on all IRB protocols so all can view data. Only if data are being shared with non-NRSS Lab members will identifying information need to be removed. In this instance, a new file will be created and the original file will not be modified. More guidelines on this is provided below in data cleaning.
- Never delete data files. If a new version of a data file is created, do not delete the old version. Instead, create a new folder and name it "old". Place all old versions there.

2 Qualtrics Development

The objective of this section is to enter the questionnaire into Qualtrics. This is not meant to be a how-to on Qualtrics but guidelines to ensure that data will export in a usable/clean manner. If you are unfamiliar with Qualtrics refer to the Qualtrics Survey Software support page (<https://www.qualtrics.com/support/survey-platform/getting-started/survey-platform-overview/>).

Two types of survey distributions occur in the NRSS Lab, 1) online only and 2) online and hardcopy (use this section if only distributing hardcopy). Protocols for these survey distributions are provided below. Both sections begin assuming the questionnaire, maintained in either Microsoft Word (henceforth referred to as Word), Microsoft Publisher, or Adobe InDesign, has been developed and approved by the PI.

2.1 Online only

A Word document of the questionnaire must be kept up to date throughout the survey's lifecycle. This document will be used to assure the online survey content and format is correct. While developing the survey questionnaire, keep in mind the capabilities/limitations of the survey software Qualtrics. Heavily comment the Word document to indicate the following: question type, display and skip patterns, embedded data locations, etc. Additionally, this document may be shared with respondents upon request if within the project scope. For example, a Project Director (PD) within the USDA-NIFA Climate Portfolio requested the survey in advance in order to compile responses from co-PDs prior to using the online link.

There are two broad categories of question types; closed and open ended. Closed questions are limited in the acceptable responses, which are provided in the questionnaire. Open questions are long or short answer text or numeric responses where there is a box available for participants to provide their response. Selecting the appropriate question format is vital to producing a questionnaire with the correct data type upon export. Question formats and display options are provided in the Qualtrics side panel drop down menu in Qualtrics entitled "Edit Question" (Figure 1). Each question type has a specific input requirements and export features. If unfamiliar with the Qualtrics refer to Qualtrics Question Types Guide at <https://www.qualtrics.com/support/survey-platform/survey-module/editing-questions/question-types-guide/question-types-overview/>.

v

Question type

☰ Multiple choice ▾

▼ **Answer type**

Allow one answer

Allow multiple answers

▼ **Choices**

Number of choices

− 4 +

Use suggested choices

▼ **Format**

List ▾

Alignment

Vertical ▾

[Add choice group](#)

▼ **Response requirements**

Add requirements

Force response

Request response

Add validation

Figure 1. Question formats and display options available in side panel of Qualtrics software.

Common question formats are:

Closed

- **Multiple Choice:**
 - **Single answer:** Single response questions are indicated in Qualtrics with a circle. Only one answer to these questions is valid.
 - **Multiple answer:** Corresponds to questions that ask respondents to “check all that apply” and is indicated with a square in Qualtrics. More than one response is allowed for this type of question.
- **Bipolar Ranking (referred to by Qualtrics as “Matrix Table”):** Matrix tables are primarily used for bipolar ranking questions, also known as “Likert-style” questions, to gauge a respondent’s “attitude” towards a statement, which is based on a ranking system. This rank is indicated in Qualtrics with a circle. Only one answer to these questions is valid.
- **Rank Order:** Used to allow respondents to rank a set of items against each other.
- **Dropdown List:** Used to allow respondents to choose from a standard list of responses.

Open

- **Text:** Respondent answers text in the field provided. Character limits can be added by specify the text type. Text entry can vary from single line to essay, which will affect the size of text box displayed. Validation can be set to force response or ensure only correct data types are entered by the respondent (i.e., character range, phone number, email address, text only, etc.)
- **Numeric:** Respondent answers numbers in the field provided. Validation can be set to force response or ensure only correct data types are entered by the respondent (i.e., phone number, numeric only, numeric range, date etc.)

2.1.1 Create a Qualtrics survey

Once the Word document of the survey questionnaire is complete, create a Qualtrics survey to mimic the questionnaire. In Qualtrics, click “Create a new project” and follow the steps to build a blank project on your own. Name the project using the following nomenclature: Project name_survey_description_year_template. For example, “StMarys_Watershed_FarmerSurvey_2019_template” or “NWQI_ConservationStaff_2019_template”. This version will never be published and can be used for a similar project in the future. Continue to build the survey using this “template” version.

2.1.2 General formatting

There are two types of general formatting used on the entire questionnaire. The first sets how the survey will appear to the respondents and the second modifies the default settings for how the questionnaire will function. Setting the appearance of the questionnaire is set in the “Look and Feel.” Purdue University has templates in the Purdue Qualtrics system. NRSS Lab uses a standardized Purdue template for the “look” of the questionnaire. In the upper left menu of Qualtrics, click on “Look and Feel” icon (paint roller) then, Theme Purdue University. Scroll down under Static Themes to Purdue University – Plain (Figure 2).

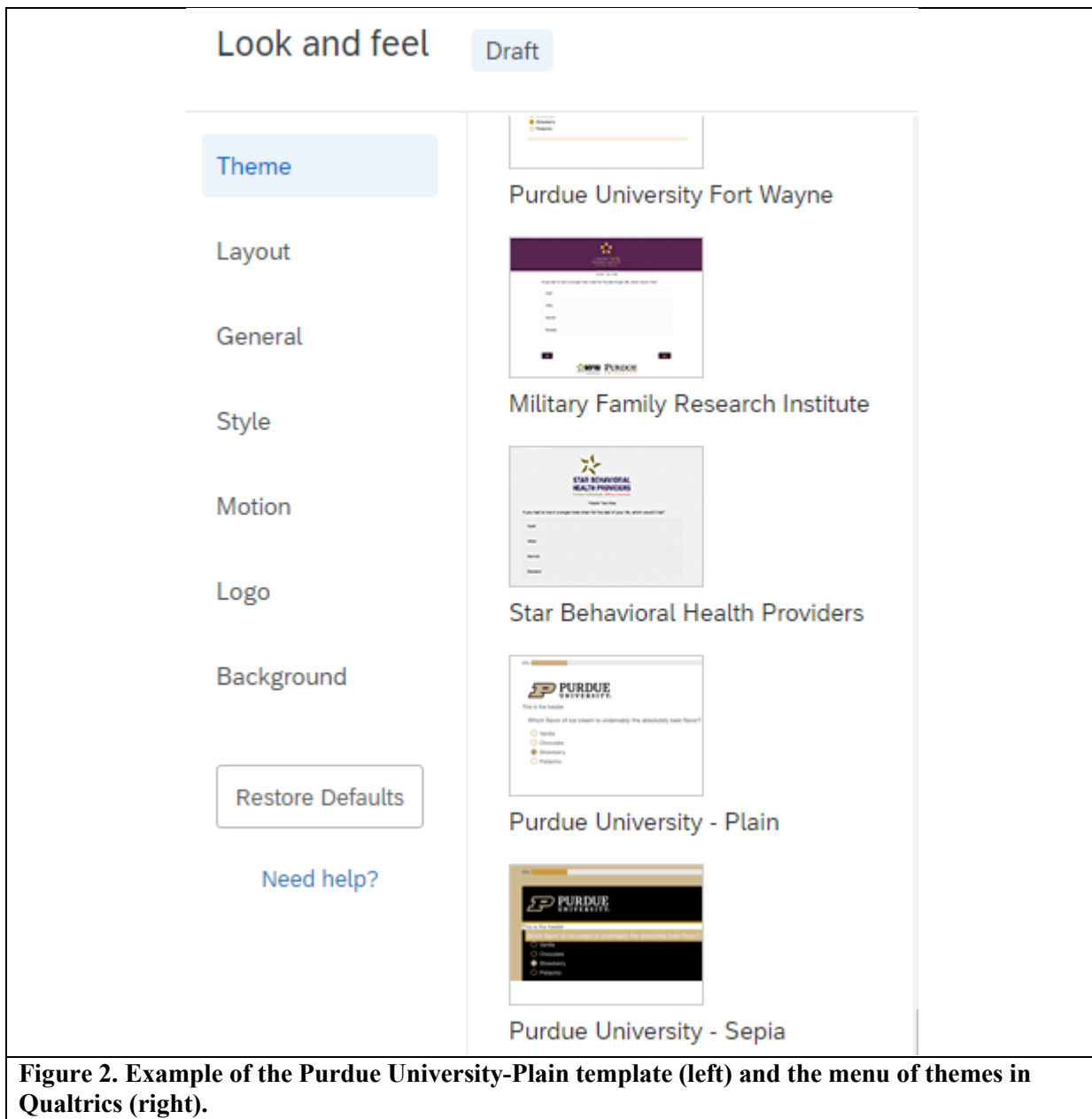


Figure 2. Example of the Purdue University-Plain template (left) and the menu of themes in Qualtrics (right).

In the same menu, there are standard options for NRSS surveys under other icons, including:

- under “Survey Options” icon
 - Responses - Back Button: Click to ensure respondents can scroll through the survey to change their responses prior to submission.
 - Partial Completion: set the action (record/delete) and duration for responses to a partially completed survey.
- under “Survey Flow” icon

End of Survey – Customize – customize the end of survey message, redirect to a URL, and show a response summary.

2.1.3 Fieldnames/Question names in Qualtrics

Qualtrics gives each question a default number/code called a fieldname. These fieldnames do not reset if you need to reorder the questions once the survey is entered into Qualtrics. Questions can be renamed by clicking on the current name. Do not use spaces rather use an underscore or start the fieldname with a numeric. These fieldnames will be the column headers in your data export. The NRSS Lab uses standard nomenclature for some questions (See Appendix A).

2.1.4 Recording and formatting values

Recoding

Do not “publish” the survey until the survey is final and ready to distribute (see warning included from Qualtrics below). To test the survey in any of the stages outlined below make a copy of the survey, publish, and test the copy.

“Warning: Recode values stop updating to reflect the new answer choice order once you start collecting responses (or if you copy a survey that has collected responses).”

In addition to Qualtrics giving each question a default number/code as stated in Section 2.1.3., Qualtrics gives each response a default number/code. These codes do not reset if you need to reorder the responses once the survey is entered into Qualtrics. Response codes can be viewed and adjusted by scrolling to the bottom of the Edit Question menu along the left side of the question block. Select “Recode Values” and a window will open. Select (a check mark will appear in the box) “Recode Values”, “Variable Naming,” and “Export Tags” (if applicable) to show all codes. Modify as needed using the following guidelines.

- Do not use spaces.
- Recode all binary responses to zeros and ones. Qualtrics does not do this by default so all No/Yes responses will need to be recoded with 0/1 respectively (Figure 3).

For Likert scale questions (Matrix table, Matrix type = Likert) be sure to have appropriate numerical scale (e.g. 0-4, or 1-5, etc).

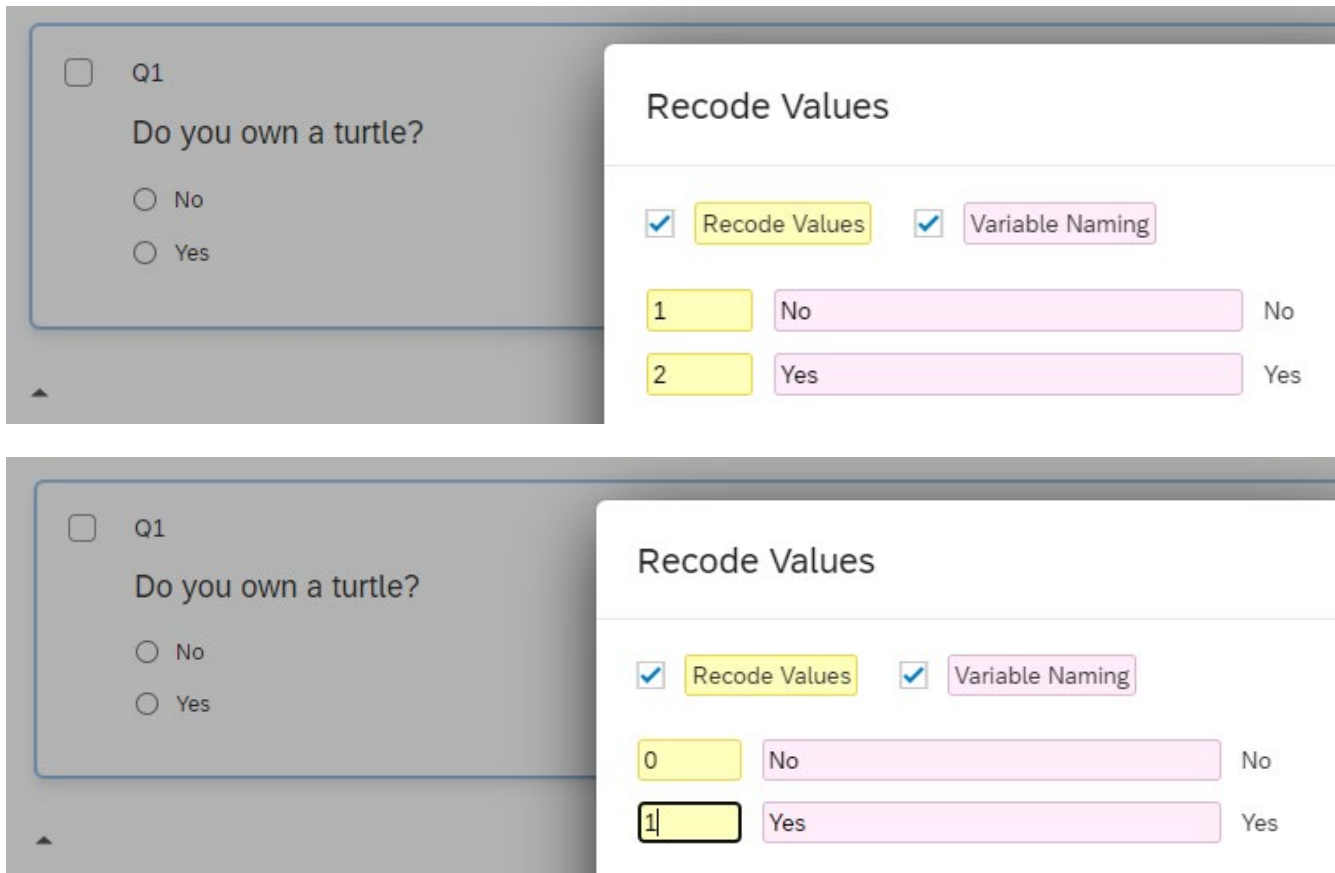


Figure 3. Recode binary response (top) to 0 and 1 (bottom) for No and Yes, respectively.

Formatting

Various formatting is required through the questionnaire to ensure data export is correct. Qualtrics uses validation to force response to a question and/or ensure the format of a response is valid. These options are located in the Edit Question sidebar to the left of the question block.

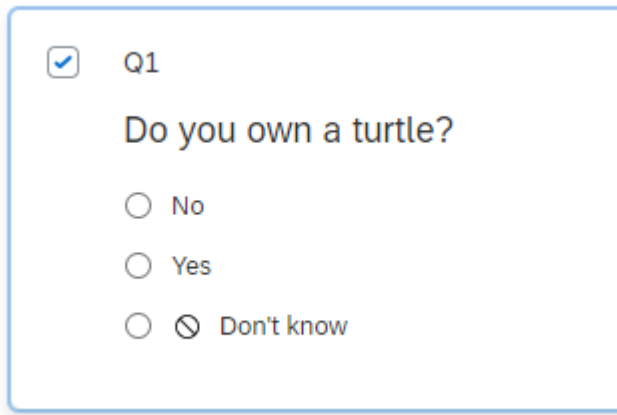
- Response requirements:
 - Add requirements (toggle on); Force response – use when a response to a question is required, i.e., for lab data entry, this includes UniqueID, data entry comments.
 - Add validation (toggle on) – use for text entry responses to ensure a response is the format requested, for example, text entry of an email address, phone number, state name, zip code, or date (select mm/dd/yyyy). Content validation can also be used to force a numeric response, for example, if you request number of acres, a number validated response must be “0” and cannot be “none”. Under “Add validation”, choose “Content type” in the first dropdown menu, then choose “Content Type” under the second dropdown menu (for example, email address, number, text only, etc.).

For text entry open responses, specify the text type since text entry can vary from single line to essay, which will affect the size of text box displayed.

Dropdown lists provide a list of formatted answer choices allowing survey respondents to choose one. The most common example is collecting demographic information such as “what year were you born”. Create the dropdown list by adding year choices, then recode values so values match the year choice. This question has already been created and saved in a library for import into a survey.

Qualtrics has a default list (including but not limited to “Not Sure”, “Not Applicable, and “Don’t know”) of response that it will automatically exclude from analysis. This is indicated by a small black circle with a line through it next to the text. If this symbol is present (Figure 4) it must be removed in order to include the “Don’t know” response code in the data export. Remove by clicking the dropdown menu for that response and unchecking “Exclude From Analysis.” In addition, these responses will need to be recoded. The NRSS Lab uses the following standard codes:

- “Don’t know” or “Not familiar” or “Not sure” recode as “9”
- “Don’t use” or “Not relevant” or “Not applicable” recode as “88”
- “Choose not to answer” recode as “77”



The image shows a screenshot of a Qualtrics question interface. At the top left, there is a checked checkbox and the label 'Q1'. Below this is the question text 'Do you own a turtle?'. There are three radio button options: 'No', 'Yes', and 'Don't know'. The 'Don't know' option has a small black circle with a diagonal line through it, which is the 'Exclude From Analysis' notation.

Figure 4. “Exclude From Analysis” Qualtrics notation example

2.1.5 Question behavior

Be sure to review the difference between ways to navigate between questions. Display and skip logics are common methods used to move participants between questions. Note that a participant must select the responses to activate the logic. If a participant does not answer the question the display or skip logic is based on, the participant will not be directed to the question wished to be displayed nor skip over the desired questions.

There are other methods to move between questions within Qualtrics. Using questions blocks, embedded data, and survey flow are more sophisticated methods. Depending on your survey instrument you may want to review these techniques.

2.1.6 Contacts

To distribute a survey online to specific recipients a contact list of emails must be created. See Qualtrics “About Creating Contact Lists” from a csv at <https://www.qualtrics.com/support/survey-platform/contacts/contact-list-overview/>. At minimum, the contact list should be composed of the following fields: email, name_last, survey_ID. Qualtrics has a limited number of acceptable contact field variable names (“FirstName,” LastName, “Email,” and “ExternalReference”) which will need to be set when the file is uploaded. Additional fields can be uploaded but will not be visible upon uploading the contact list without selecting an individual contact. Contents of the additional contact fields will vary by project due to embedded data needs (Section 2.1.7). These fields will also be the only ones that will automatically be downloaded at export. If you don’t use embedded data, upon contact list upload, change the field name of the uniqueID to “ExternalReference.” This will result in the uniqueID being included in the download automatically as the “ExternalReference.”

NOTE: add the email addresses for the Lab Manager and the Project Manager as contacts to verify invitation and reminder emails are sent correctly.

A summary of steps is provided below:

- Select Contacts at top left hand corner of the website (Under Main Menu – three lines icon).
- Select “Create Contact List”.
- In pop up window, fill in the “Enter Name” and select the folder it will be stored in if applicable. Recommend that a folder is created for each project.
- Select the “Browse” button to upload file, which must be a csv.
- Assign default Qualtrics fields for column headers of csv.
- Upload contacts.

View list: Confirm count is correct. If not default category/header will not be should in list. Will be visible when clicking individual.

2.1.7 Embedded data

Embedded data is additional information that can be included in the data export along with the question responses. Embedded data can also be used to determine if a specific question applies to the respondent using branch (survey flow) or display logic.

Examples on how embedded data can be used:

- If the respondent pool is known to be either a university or government agency you can set a question based on the contact list embedded data column (branch or display logic).
- With a response from a question like “Is this project ongoing?” insert embedded data to use past, present, and future verb tense (piped text).
- Incorporating project title from a contact list of project directors (piped text).

Instructions on how to use embedded data can be found on the Qualtrics website at:

<https://www.qualtrics.com/support/survey-platform/survey-module/survey-flow/standard-elements/embedded-data/>.

If information from the contact list needs to be part of the export along with the respondent answers these fields must be added as embedded data. The embedded data can be incorporated in the export without being visible to the survey recipient. However, this must be done prior to activating the survey. If these fields are not added prior to activation, the fields can be added but only after the survey has been closed.

To facilitate tracking, add contact list information to the survey by:

- Select “Survey Flow” on the sidebar to the left of the question block (flowchart icon).
- The Survey Flow window opens, select “+ Add a New Element Here”.
- Select “Embedded Data”.
- Select “Add From Contacts”.
- Select a List of Contacts from the Library.
- All of the field names from the Contact List will be added, select “OK”.
- All of the field names will be added to the “Set Embedded Data” element. Do not set any values. Select “Apply” in lower right corner to save.

These fields will now be exported with the survey data. Note, these fields will not be added to the Distribution History (accessed via the Distributions tab -> Emails -> Drop down arrow of Invite -> “Download History”) unless the field name was assigned as described in Section 2.1.3.

2.1.8 Quality Assurance (QA) and Quality Control (QC)

The following steps outline the procedure to guarantee the survey is properly reviewed.

1. The online survey is likely owned by the Project Manager (PM) at this point. The PM should share the survey with the Lab Manager (LM). The LM will make a copy of the survey and maintain ownership. Remember to name the survey as noted in Section 2.1.1.
2. Using the Word/Publisher/InDesign document of the survey questionnaire, described in Section 2.1, compare the Qualtrics survey. Recommendation is to have a lab member not directly involved in the survey development compare the survey to ensure they are identical.
 - Confirm all Qualtrics coding and display and skip logic is correct.
 - Export codebook from Qualtrics (Tools -> Import/Export ->Export Survey to Word). Save file using filename: surveyname_codebook_exportdate(YYYYMMDD).docx at location: Survey->Data->Qualtrics>Codebook
 - Review all code values and export tags are correct (binary 0/1 for No/Yes, numerical/alphabetical sequence, no spaces)
 - Review display/carry forward/skip logic is listed correctly.
 - Review Survey Flow
 - Confirm contact list embedded data was added.
 - Confirm embedded data.
 - Confirm skip, carry forward, and/or display logics.
 - Confirm branches (survey flow).
 - Preview Survey
 - Select “Preview” on the Survey tab
 - Thoroughly complete the survey looking for issues.
 - Note, it may be useful to flip through the survey using the Preview function throughout survey development to confirm the question appearance and flow.
 - Ensure all question formats are correct. For example, “check all that apply” questions allow multiple responses
 - Ensure page breaks are located appropriately; consider question/content sections; question length and page length. Page length should not require respondent to scroll down more than the length of a screen.
 - Check survey options
3. At this point, the functions of the Qualtrics survey should be correct. Make a copy of the survey by clicking on the “...” to the right of the survey listed in Qualtrics. Rename the copy using similar nomenclature. For example, if the original survey name is “St Marys Watershed_FarmerSurvey_2019_template” then rename the copy that will be used for QA/QC as “St Marys Watershed_FarmerSurvey_2019_QC01”.
4. Publish the survey copy named as QC01. Do not activate the “template” survey (see warning in Section 2.1.4. Any corrections that are identified in any of the following steps should not be made in the survey copy (QC01 version). Instead, corrections will be made to the “template” version.
5. Using the Word/Publisher/InDesign survey questionnaire, complete the QC01 version of the survey. Ensure the paper and online survey questionnaires are identical. Make notes of any differences and revise the “template” survey based on the differences found during testing. Depending on the level of edits required, previous steps may need to be repeated to ensure accuracy.
6. At a minimum have three people take and review the survey. Once corrections are made to the “template” version after QC1, copy the “template” version and rename the copy as stated in step 3 above except this will be QC2. Repeat steps 4 and 5 above. For the third review, copy the “template” version again and rename the copy as QC3. Repeat steps 4 and 5 above.
7. Once testing is complete and all corrections have been made to the “template” version, make a copy of the “template” version and rename the copy by removing “_template.” For example, if the template is named, “St Marys Watershed_FarmerSurvey_2019_template” the new copy should be named, “St

Marys Watershed_FarmerSurvey_2019.” This will be the survey that is distributed for responses. Publish the distribution survey.

8. Test the distribution survey with responses to ensure the data are reporting correctly.
 - On the Survey tab, select Tools and then “Review” -> “Generate Test Responses”
 - Enter “5” into the “Responses” box and select “Start Test”. A window will display showing the Survey Test Summary description. Note that “5” is a minimum. If the survey has complex responses and/or survey flow, 10-20 responses should be tested.
9. Export testing “data” into CSV and be sure the data export correctly.
 - Export by Data & Analysis Tab -> Export & Import -> Export Data -> CSV. Change selection near the bottom to “Use numeric values”. Then select “More Options” at bottom of window. Select the following: “Recode seen but unanswered questions as -99” and “Recode seen but unanswered multi-value fields as 0”. Select Download.
 - If changes were made to the survey during Step 2 above, export codebook again. Save new copy of codebook with new export date “surveyname_codebook_exportdate(YYYYMMDD)” at location: Survey->Data->Qualtrics>Codebook. Place the old copy in the “old” folder.
 - Open csv.
 - Review field names (i.e. column headers are correct and match codebook).

In excel, use the filter to confirm only valid response codes are within each field. To do this, click on the arrow in each column header and review the response codes listed. Use the codebook to confirm the response codes listed are correct. Do this step for each column.

2.1.9 Pilot survey (optional)

Survey pilot personnel will vary based on the survey needs. To pilot the survey, create a copy of the survey in Qualtrics using the same name followed by “_pilot”. Identify personnel to pilot the survey and mimic the distribution steps that will be used for the survey. Once the survey has been piloted, if changes are required repeat the QA/QC steps as needed.

2.1.10 Finalize survey

Once the survey has been through the QA/QC and pilot process and no further edits are required the survey is ready to be finalized. Finalize the survey for distribution by:

- Confirm survey filename is correct. Filename should not have “template”, “pilot”, or “QC” at the end.
- In the Data & Analysis tab there should be data presented in table format from the Survey Previews and Tests conducted during development and QA/QC. These data should be deleted prior to distribution. While on the Data & Analysis tab, click the empty square to the left of the data columns to select all rows of data. Then click the trash can icon on the far right. Select “I am sure I want to delete X response(s), then click the delete button.
 - Delete Survey Previews.
 - Delete Survey Tests.

The survey is ready to distribute.

2.2 Online and hardcopy

Online and hardcopy surveys occur when a survey is distributed with an online link option for respondents to complete the survey. This option is usually specified in the initial correspondence (e.g. advance letter). All steps provided in the creation of the Online Only survey (Section 2.1) apply here with the exception of, in most cases, embedded data and contact list embedment will not be necessary. Additional steps are required for comparing the hardcopy survey, which will also be distributed in this case. Note that hardcopy surveys returned to the NRSS Lab will be entered into a copy of the Online survey so they must be identical.

2.2.1 Create a Qualtrics survey

Be sure to confirm that the hardcopy question format is possible to be formatted in the same way online.

The front page of the online survey (renamed as “intro”) is generally an image created using the advance letter. To create this image, make a version of the advance letter that eliminates the following information:

- Date
- Information pertaining to the two options to complete the survey, including everything in the colored box Signatures (optional)

2.2.2 General formatting (see Section 2.1.2)

2.2.3 Fieldnames/Question names in Qualtrics (see Section 2.1.3)

2.2.4 Recoding and formatting values (see Section 2.1.4)

2.2.5 Question behavior (see Section 2.1.5)

2.2.6 Quality Assurance (QA) and Quality Control (QC)

The following steps outline the procedure to guarantee the survey is properly reviewed.

1. The online survey is likely owned by the Project Manager at this point. The Project Manager should share the survey with the Lab Manager. The Lab Manager will make a copy of the survey and maintain ownership. Remember to name the survey as noted in Section 2.1.1.
2. Using the Word/Publisher/InDesign document of the survey questionnaire, described in Section 2.1, compare the Qualtrics survey. Recommendation is to have a lab member not directly involved in the survey development compare the survey to ensure they are identical.
 - Confirm all Qualtrics coding and display and skip logic is correct.
 - Current codebook is located at: Survey->Data->Qualtrics>Codebook
 - Review all code values and export tags are correct (binary 0/1 for No/Yes, numerical/alphabetical sequence, no spaces)
 - Review display/carry forward/skip logic is listed correctly.
 - Review Survey Flow
 - Confirm skip, carry forward, and/or display logics.
 - Confirm branches (survey flow).
 - Preview Survey
 - Select “Preview” on the Survey tab
 - Thoroughly complete the survey looking for issues.
 - Note, it may be useful to flip through the survey using the Preview function throughout survey development to confirm the question appearance and flow.
 - Ensure all question formats are correct. For example, “check all that apply” questions allow multiple responses
 - Ensure page breaks are located appropriately; consider question/content sections; question length and page length. Page length should not require respondent to scroll down more than the length of a screen.
 - Check survey options
3. Revise ALL of the question/block/variable names to match the hardcopy. Qualtrics has a 20 character limit for these names. Warning: don’t just use “auto-number” in Qualtrics because it won’t necessarily match the survey numbers. Standard field names used by the NRSS Lab are included in Appendix A. Some examples include:
 - If you have Section headers in the paper questionnaire, change the Q# in Qualtrics to “Section_1”. Don’t let Qualtrics assign a random “Q#”.
 - Assign “uniqueID” for Q# field associated to the survey unique identifier (ID). This is often a 4-digit number, but can be more if the sample size is large.

- If the survey includes a map, change the Q# in Qualtrics to “map”.
4. Every survey requires a unique identifier (ID). This ID is unique for each survey. Restrict uniqueID response field to numerical. If a survey respondent makes the ID illegible or it is omitted, it will be entered as “9999”). Do not force a response. Optional: specify range (for example, if IDs for the project range from 1000-2999, specify the range of 1000 to 9999).
 5. At this point, the functions of the Qualtrics survey should be correct. Make a copy of the survey by clicking on the “...” to the right of the survey listed in Qualtrics. Rename the copy using similar nomenclature. For example, if the original survey name is “St Marys Watershed_FarmerSurvey_2019_template” then rename the copy that will be used for QA/QC as “St Marys Watershed_FarmerSurvey_2019_QC01”.
 6. Publish the survey copy named QC01. Do not activate the “template” survey (see warning in Section 2.1.4). Any corrections that are identified in any of the following steps should be made to the “template” version of the online survey, not the QC01 version.
 7. Test survey. Using the Word/Publisher/InDesign survey questionnaire, the first reviewer should complete the QC01 version of the survey. Ensure the paper and online survey questionnaires are identical.
 - Use “XXXX” as “survey ID” the unique identifier when testing survey online. This will not work if a numeric range has been specified.
 - Look for discrepancies between Publisher/InDesign and Qualtrics versions. Examples of differences that require revisions include, but are not limited to: Hardcopy has write-in section for numerical response, but Qualtrics has drop-down menu; wording doesn’t match; a question is out of order.
 - Make notes of any differences and revise the “template” survey based on the differences found during testing. Depending on the level of edits required, previous steps may need to be repeated to ensure accuracy.
 8. At a minimum have two additional people take and review the survey (reviewer 2 will take the QC02 version, reviewer 3 will take the QC03 version, etc.). Once corrections are made to the “template” version after QC01, copy the “template” version and rename the copy as stated in step 5 above except this will be QC02. Repeat steps 7 and 8 above. For the third review, copy the “template” version again and rename the copy as QC03. Repeat steps 7 and 8 above. The survey should be tested until a reviewer does not find errors.
 9. Export testing “data” into CSV and be sure the data export correctly.
 - Export by Data & Analysis Tab -> Export & Import -> Export Data -> CSV. Change selection near the bottom to “Use numeric values”. Then select “More Options” at bottom of window. Select the following: “Recode seen but unanswered questions as -99” and “Recode seen but unanswered multi-value fields as 0”. Select Download.
 - Open csv.
 - Review field names (i.e. column headers are correct and match codebook).
 - In excel, use the filter to confirm only valid response codes are within each field. To do this, click on the arrow in each column header and review the response codes listed. Use the codebook to confirm the response codes listed are correct. Do this step for each column.
 - If changes were made to the survey during QC, export codebook again. Save new copy of codebook with new export date “surveyname_codebook_exportdate(YYYYMMDD).docx” at location: Survey->Data->Qualtrics>Codebook. Place the old copy in the “old” folder.
 10. Finalize survey. All corrections have been made to the template version of the online survey. Make a copy of the template version and rename by removing “_template”. For example, the final survey should be named, “St Marys Watershed_FarmerSurvey_2019”. This will be the survey that is published for responses.

2.2.7 Finalize survey

Once the survey has been through the QA/QC and pilot process and no further edits are required the survey is ready to be finalized. Finalize the survey for distribution by:

- Confirm survey filename is correct. Filename should not have “template”, “pilot”, or “QC” at the end.
- In the Data & Analysis tab there should be data presented in table format from the Survey Previews and Tests conducted during development and QA/QC. These data should be deleted prior to distribution. While on the Data & Analysis tab, click the empty square to the left of the data columns to select all rows of data. Then click the trash can icon on the far right. Select “I am sure I want to delete X response(s)”, then click the delete button.
 - Delete Survey Previews.
 - Delete Survey Tests.

The survey is ready to distribute.

3 Distribution

Objective: send survey to recipients and in-house procedure during distribution phase.

3.1 Online only

The survey is final and owned by the Lab Manager (see Section 2.1.10) and the contact list is complete (see Section 2.1.6).

Project Manager should draft the invitation and reminder email(s) language and provide to Lab Manager. These can be drafted in a Word document.

Once the Lab Manager and Project Manager have determined the survey mailing schedule which includes the initial invitation to complete the survey and any reminders, the Lab Manager will customize the survey expiration date.

- The survey expiration date can be customized but only when you send the initial invite email using (Project Name -> Distributions -> Emails -> Compose Email -> Show Advanced Options -> Link Expiration->Custom). Set the date and time of survey expiration. Once you send the invite email, the expiration date cannot be changed.

Lab Manager formats and schedules initial invitation email and subsequent reminders in Qualtrics. Once complete, Lab Manager publishes the survey.

3.2 Online and hardcopy

3.2.1 Mailing

The survey is final and owned by the Lab Manager (see Section 2.2.7). Lab Manager copies the final Qualtrics survey and renames the copy ending with “_LabEntry”.

Lab Manager and Project Manager determine survey mailing schedule and dates (typical = advance letter, 2 weeks later – mail survey #1, 2 weeks later – mail reminder postcard, 2 weeks later – mail survey #2, 3 weeks later – mail survey #3 with final postcard). The mailing schedule is based on recommendations provided in Dillman, Smyth, and Christian (2014) and the current mail trends with the US Postal Service.

Lab Manager activates the survey and creates a Tinyurl (<http://tinyurl.com/>), a shorter URL given to respondents that links directly to the final Qualtrics survey. Insert the tinyurl into the advance letter and the hardcopy questionnaire. Be sure the tinyurl is NOT underlined in the advance letter and on the hardcopy questionnaire (the underlining causes confusion for survey respondents making the “y” look like “v”).

Project Manager provides Lab Manager a Microsoft Excel file with survey recipient address information (see filename: Template_MailingAddress_20221114.xlsx). Lab Manager stores address file in Surveys/Mailing/Addresses folder (filename: ProjectName_addresses_YYYYMMDD.xlsx). Lab Manager adds a column for a unique survey ID (generally 4-digits, begin with 1000), given to each address and a column named “response_code”. Lab Manager stores tracking file in Surveys/Mailing/Tracking folder (filename: ProjectName_addresses_tracking_YYYYMMDD.xlsx). This file is for mailing purposes only and should not be used to determine response rate.

Lab Manager prepares advance letters for mailing.

- Lab Manager makes photocopies of advance letters and creates mailing labels (see methods: MailLabels_HowTo_20170614.docx)
- Undergraduate staff stick mailing labels and stamps to envelopes. This can be done well in advance of the first mailing.
- Undergraduate staff fold advance letters in a Z-fold.. To assemble letters, undergraduate staff write the survey ID (located on the mailing label) on the advance letter and place into corresponding envelope. Make sure to write numbers clearly and include cross hatches through zeros and sevens. Do not seal envelopes.

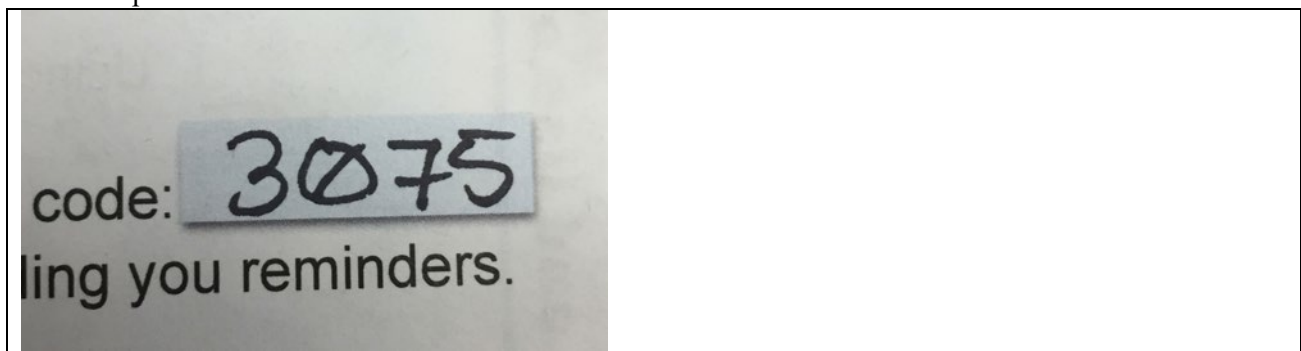


Figure 5. Include cross hatches through zeros and sevens when writing Survey ID.

- Once all letters are stuffed, Lab Manager will check 5% by randomly selecting an envelope, removing the letter, and ensuring the survey ID is legible and matches the ID on the mailing label. If illegible or incorrect, renumber a new advance letter.

- Undergraduate staff seal envelopes using the foam water applicators and deliver completed mailing to the mailroom in the basement of Pfendler Hall or directly to the post office.
- Repeat for subsequent mailings. Subsequent mailing labels should be assembled 2-3 days before the next scheduled mailing. If hardcopy surveys are returned after labels are made, remove the envelopes with the returned survey IDs.

3.2.2 Tracking

Returned hardcopy surveys and surveys completed through Qualtrics are tracked by the Lab Manager to ensure respondents do not receive a request to complete a survey after they have already completed one.

Returned Hardcopy Surveys

When mail is received, Lab Manager/undergraduate staff remove hardcopy surveys from their envelopes and any accompanying documentation is stapled to the survey. Each survey is stamped with date received in a blank area of the survey.

Any returned envelopes or surveys (e.g., bad address, refusals) are stamped with date received; if it is a bad address; remove survey and recycle, remove return envelope and save for future use.

- If envelope is returned by the post office as a bad address, it usually has a yellow or white sticker indicating the reason for return. These are considered a “bad address”.
- If envelope is returned with a written note from the recipient indicating refusal, write “refusal” on the note (make sure the note is date stamped; no need to keep the envelope).

Check each survey for responses. If there are no responses, indicate “refusal” at the top of survey: Lab Manager codes as “refusal”. Place all received surveys and envelopes in numerical order by survey ID and provide to Lab Manager.

Tracking Surveys

Using the survey ID, the Lab Manager enters the mailing response codes for each survey and envelope received and each online survey completed into the Microsoft Excel file used for tracking located in the Tracking Folder.

The response codes recorded should be one of the following:

- “1” means the mailed survey is complete. The respondent returned the hardcopy survey by mail and at least one question was answered.
- “2” means online survey response. The respondent opened the link (URL) to the online survey. The completion of the online survey is determined during data cleaning.
- “3” means refusal. The respondent refused to accept the mailing and it was returned to the NRSS lab by the recipient or the US Postal Service (USPS).
- “4” means bad address. The mailing was returned unopened or incomplete because it could not be delivered by the USPS or the recipient indicated the address is no longer current (e.g., death, moved, etc.).

Once all mailing response codes are entered for returned surveys, hardcopy surveys and envelopes are filed in the labeled fireproof cabinet space in Forestry Building 201. Hanging file folders should be labeled with “data entry” to identify that these surveys have not been entered.

Lab Manager logs into Qualtrics and records a response code for each online survey response, using the survey ID entered.

4 Entry

Objective: Lab Manager prepares documentation for data entry of hardcopy surveys, closes surveys, and ensures data quality and assurance.

4.1 Hardcopy surveys

Responses to hardcopy surveys are recorded in a separate Qualtrics online survey that is identical to the distributed survey. In Section 3.2.1, the Lab Manager copied the template online survey and renamed the survey to “_LabEntry”. The Lab Manager then makes the following changes to the _LabEntry Qualtrics version:

1. Removes all skip patterns from the lab entry version of the final Qualtrics survey – this allows data entry personnel to enter all responses made when the respondent was supposed to skip questions.
2. Removes all validation requirements from the lab entry version of the final Qualtrics survey – this allows data entry personnel to enter text responses made when the respondent was supposed to enter a numerical value.
3. Add all of the following new “questions” to the lab entry Qualtrics survey (Figure 6). Be sure that if skips are not removed ALL of the new fields are accessible to the data entry personnel.
 - “*Data_entry_personnel*”: initials of person entering data
 - “*Date_received*”: date of stamp indicating when the survey was returned to lab.
 - “*Receipt_type*”: type of response received (survey, phone call, email, other)
 - “*Phone_call_personnel*”: initials of person collecting data over the phone. This is displayed only if receipt type phone call was selected in previous question.
 - “*Response_type*”: indication of survey response type (complete, duplicate, refusal, bad address)
 - “*Add_respondent_notes*”: indicate any additional comments respondents entered on the survey (e.g., in the margins, next to responses, etc.) Enter all comments in quotes. If none, enter “NA”.
 - Example: [pg 13, Q21 arrow from Q21 to margin]: "Of course climate changes"; [pg 10, Q12 crossed out answers]: "NA"
 - “*Data_entry_notes*”: Data entry personnel observations/comments.
 - Example: [pg 10, Q15a] respondent checked both “Very important” and “Somewhat important”. Treated as not answered.
4. LM publishes lab entry version of Qualtrics survey and makes a tinyurl for the link. LM provides the tinyurl to the data entry personnel.
5. The Project Manager/Lab Manager will enter survey first. Confirm the changes made above are functioning correctly and that the data exports correctly. If changes are needed, re-publish the survey once changes are complete.
6. Data entry personnel are required to read and sign the Data Entry 101 guide prior to entering any data.
7. Data entry personnel complete data entry. It is recommended that if new data entry personnel is completing entry the Project Manager/Lab Manager periodically QC the entry to ensure data are being entered correctly from the start.
8. Once data entry is completed for a survey, the date of completion and initials of the data entry personnel are recorded near the date stamp. Surveys are then filed in the labeled fireproof cabinet in Forestry 201. Hanging file folders should be labeled with survey IDs so surveys are filed in numerical order (narrow file folders can likely be labeled to hold 50-75 surveys, wide folders may hold 150-200 surveys (note, response rate will not be 100% so each folder will not actually hold the exact number labeled).

<p>data_entry_personnel</p> <p>What are the initials of the person entering these data?</p> <input type="text"/>
<p><input type="checkbox"/> response_received</p> <p>Indicate the type of response received.</p> <p><input type="radio"/> survey</p> <p><input type="radio"/> phone call</p> <p><input type="radio"/> email</p> <p><input type="radio"/> other (specify):</p> <input type="text"/>
<p>response_type</p> <p>Survey Response Type: Please indicate the response type for this survey:</p> <p><input type="radio"/> Complete: survey has at least one question answered by the respondent, unless response in the final comment box is a refusal.</p> <p><input type="radio"/> Duplicate: survey is a duplicate of an already completed survey.</p> <p><input type="radio"/> Refusal: survey respondent refused to complete the survey.</p> <p><input type="radio"/> Bad Address: survey was returned unopened because it could not be delivered by the post office.</p>
<p>add_respondent</p> <p>Additional respondent comments: Please indicate any additional comments respondents entered on the survey (e.g., in the margins, next to responses, etc.) Enter all comments in quotes.</p> <p>Please enter in the following format: [pg 13, Q21 arrow from Q21 to margin]: "Of course climate changes"; [pg 3, Q7 in margin]: "maybe"; [pg 10, Q12 crossed out answers]: "NA"</p> <p>If none, enter NA</p> <input type="text"/>

Figure 6. Examples of questions added to the Lab Entry Qualtrics version of a survey.

4.2 Closing the survey

The Project Manager and Lab Manager decide when to close a survey. If the distribution includes both an online and hardcopy, typically these are closed simultaneously. “Closing” a survey is when questionnaires are no longer being accepted for inclusion in the survey results.

Online

To close the online survey, change the status from “active” to “closed” in Qualtrics. Under “Distributions,” click “Pause Response Collection” and choose “Stop them and record them according to the survey’s partial response completion settings.”

The protocol for exporting and creating the codebook is discussed in Section 2.1.8. If any changes were made during survey distribution, export the updated codebook from Qualtrics to Word. To store the file, follow the subsequent naming and filing locations:

- Filename: surveyname_codebook_exportdate(YYYYMMDD).docx
- Save location: Survey->Data->Qualtrics>Codebook

Use the following steps to export the survey data from Qualtrics.

1. Go to “Data & Analysis,” then “Export & Import,” choose “Export Data.”
2. Select “CSV” in the top row of the “Download a data table” pop up window. Data must be exported as a csv file.
3. Ensure the “Download all fields” box is checked.
4. Under “Numeric responses or choice text”, change to “use numeric values”.
5. Click “More Options” and ensure the following are all selected:
 - “Remove line breaks”
 - “Recode seen but unanswered questions as -99”
 - “Recode seen but unanswered multi-value fields as 0”
 - “Split multi-value fields into columns.”
6. Click “Download.”

To store the file, follow the subsequent naming and filing locations:

- Filename: surveyname_online_exportdate(YYYYMMDD).csv
- Location: Survey->Data->Qualtrics->Export->source

Hardcopy

Hardcopy surveys are no longer accepted after the close date. Any survey received after the closed date should be shredded.

Project Manager/Lab Manager exports lab entry survey data to csv. Use the following steps to export the survey data from Qualtrics.

1. Go to “Data & Analysis,” then “Export & Import,” choose “Export Data.”
2. Select “CSV” in the top row of the “Download a data table” pop up window. Data must be exported as a csv file.
3. Ensure the “Download all fields” box is checked.
4. Under “Numeric responses or choice text”, change to “use numeric values”.
5. Click “More Options” and ensure the following are all selected:
 - “Remove line breaks”
 - “Recode seen but unanswered questions as -99”
 - “Recode seen but unanswered multi-value fields as 0”
 - “Split multi-value fields into columns.”
6. Click “Download.”

To store the file, follow the subsequent naming and filing locations:

- Filename: surveyname_labentry_exportdate(YYYYMMDD).csv
- Location: Survey->Data->Qualtrics->Export->source

The protocol for exporting and creating the codebook is discussed in Section 2.2.6. If any changes were made during survey distribution, export the updated codebook from Qualtrics to Word. To store the file, follow the subsequent naming and filing locations:

- Filename: surveyname_codebook_exportdate(YYYYMMDD).docx

Save location: Survey->Data->Qualtrics>Codebook

4.3 Quality Assurance (QA) and Quality Control (QC)

The following steps outline the procedure to guarantee the data entry is properly reviewed.

4.3.1 QC export of data files

Project Manager/Lab Manager exported the data files for both the hardcopy data entry and the online survey responses to csv files and saved them in the source folder (Section 4.2). The Lab Manager saves copies of both the hardcopy data entry and the online survey responses as Microsoft Excel files (.xlsx) using the following naming and location:

- Filenames: surveyname_labentry_exportdate(YYYYMMDD).xlsx and surveyname_online_exportdate(YYYYMMDD).xlsx
- Location: Survey->Data->Qualtrics->QA_QC

If the survey was online only, there will only be the online survey response file.

- i) Use filter in Excel to look for export issues particularly associated with long text field entries. Common errors include extra row breaks and #NAME. If these data issues exist recopy data from Qualtrics.
- ii) There are three lines of information in each data worksheet downloaded from Qualtrics; (1) field names/question numbers, (2) Questions, and (3) Qualtrics import tags. Lab Manager will delete the third line containing import tags. Lab Manager will copy the first two lines (field names/question number and questions), open a new worksheet, click on Paste->Paste Special->Transpose. Rename worksheet “metadata”. Metadata will be completed later during the cleaning phase.
- iii) Lab Manager will delete second line containing questions.

4.3.2 Online surveys

Responses submitted to an online survey also require some review.

In Excel, use the filter to review columns for data anomalies (i.e., date or “code” formatting is incorrect). To do this, click on the arrow in each column header and review the responses/codes listed. Use the codebook to confirm the response codes listed are correct. Do this step for each column. Highlight issues for further review.

If data anomalies are found, such as incorrect response coding in Qualtrics, Project Manager/Lab Manager adds additional columns to the end.

1. “QC_personnel”: initials of lab personnel performing the QC
2. “QC_comments”: any comments/concerns/issues noted by QC personnel
3. “QC_resolution”: describe changes made to address the QC_comments

Project Manager/Lab Manager makes changes to the Excel file that were identified in the above QC process, completing the three columns added above. Save new file:

Filename: surveyname_online_exportdate_QC_QCcompletedate.xlsx

Location: Location: Survey->Data->Qualtrics->QA_QC

4.3.3 Hardcopy surveys

QC of uniqueID and date received

Lab entry survey data were saved as a Microsoft Excel file (.xlsx) in Section 4.3.1.

The Lab Manager creates another worksheet within the lab entry survey data Excel file, named “uniqueID_QC”. In this worksheet, the Lab Manager creates a QC table with the following columns (filename: uniqueID_QC)

1. “Unique_ID”
2. “Data_entry_personnel”
3. “Date_received”
4. “Response_type”

Save this file with the following naming structure and location:

- Filename: surveyname_labentry_uniqueID_QC_exportdate(YYYYMMDD).xlsx
- Location: Survey->Data->Qualtrics->QA_QC

Cut and paste data for these four columns from the original data file worksheet

1. In Excel, use the filter to review columns for data anomalies (i.e., date or “code” formatting is incorrect). To do this, click on the arrow in each column header and review the responses/codes listed. Use the codebook to confirm the response codes listed are correct. Do this step for each column. Highlight issues for QC.
2. In Excel, use “conditional formatting” to identify duplicate “codes”. Highlight for QC.
3. Add additional columns to the end.
 - a. “Survey (Y or N)” – indicate if the survey is found in the files (Y) or not found (N)
 - b. “QC_comments” – indicate any errors

Add blank rows at the end for additional entries, page numbers, and QC personnel. Make sure the first row prints on each page then print a hardcopy of this worksheet for data entry personnel to QC (Table 1).

Lab Manager provides worksheet to the data entry personnel for QC. Data entry personnel ensures all data were entered correctly by comparing the information provided on the worksheet to each hardcopy survey. Data entry personnel also indicate if the survey is found/missing from the hanging file folder and notes any errors in the “Comments” column.

Each data entry personnel should complete an entire page of the worksheet. Once a page is completed, the data entry personnel adds initials to the QC_Personnel at the bottom of the page.

If a survey is found in the file but is not included on the worksheet, the data entry personnel should add all the survey information in the blank lines at the end of the spreadsheet.

Table 1. Example of completed uniqueID_QC worksheet (gray = data from Microsoft Excel worksheet; blue = information provided by data entry personnel during the initial QC process.

Unique ID	Data entry personnel	Date received	Response Type	Survey (Y or N)	Comments
1180	MB	8/11/2021	1	Y	date received is incorrect, should be "07/16/2021"
1182	JMY	8/23/2021	1	Y	NA
1290	JMY	7/16/2021	1	Y	data entry personnel initials are missing
6028	6028	7/7/2021	4	Y	data entry personnel initials are incorrect, should be "MB"
6187	LAE	9/10/2021	1	N	survey is missing
1828	JMY	8/9/2021	4	Y	uniqueID not entered into database
-9999	ERW	8/10/2021	1	Y	uniqueID recode
-9999	ALL	9/11/2021	1	Y	uniqueID recode

Digitize QC data

Once the hardcopy worksheet is complete, all written information must be digitized. In the original data file (filename: : surveyname_uniqueID_QC_exportdate.xlsx, add additional columns to the right side

1. "Page" – indicate the page number from the hardcopy QC document
2. "QC_personnel" – indicates the person who completed the QC (initials should be taken from the bottom of the hardcopy page)
3. "Digitized_by" – Initials of person digitizing the data, including if there are multiple "-9999" uniqueIDs that are recoded. Each should indicate "recoded to -9998", "-9997", etc.
4. "Data_entry_notes" – indicate any problems with digitizing information from the hardcopy (e.g., illegible handwriting) and note the action needed to make a correction to the data (e.g., change date received, change data entry personnel initials, exclude from analysis, enter into database). If there are multiple "-9999" uniqueIDs, indicate they need to be recoded.

Lab Manager/Undergraduate enters data from hardcopy worksheet to electronic copy

Error identification and resolution

Project Manager/Lab Manager adds additional columns to the right side of the QC spreadsheet

1. "error_identified" – indicate if there is an error (1) or is not an error (0)
2. "resolution" – indicate what was done to resolve the error (e.g., changed date received, changed data entry personnel initials, exclude from analysis, entered into database). If there are multiple "-9999" uniqueIDs, each should indicate "recoded to -9998", "recoded to -9997", etc.
3. "[Filename] revised" – indicate initials of person who has revised the errors in the data file. This step will be completed under QC of lab data entry below.

Project Manager/Lab Manager identifies errors and the resolution. See Table 2 for a completed QC worksheet.

Table 2. Example of a completed uniqueID_QC worksheet (gray = data from Microsoft Excel worksheet; blue = information provided by data entry personnel during the initial QC process; green = data digitized by Lab Manager/undergraduate; orange = data from error and resolution process).

Unique ID	Data entry personnel	Date received	Response Type	Survey (Y or N)	Comments	Page	QC personnel	Digitized by	Data entry notes	Error identified	Resolution	[filename] revised
1180	MB	8/11/2021	1	Y	date received is incorrect, should be "07/16/2021"	2	AAB	LAE	Change date received	1	Changed date received	LAE
1182	JMY	8/23/2021	1	Y	NA	2	AAB	LAE	NA	0	NA	NA
1290	JMY	7/16/2021	1	Y	data entry personnel initials are missing	2	AAB	LAE	Add data personnel initials	1	Added data personnel initials	LAE
6028	6028	7/7/2021	4	Y	data entry personnel initials are incorrect, should be "MB"	2	AAB	LAE	Change data personnel initials	1	Changed data personnel initials	LAE
6187	LAE	9/10/2021	1	N	survey is missing	2	AAB	LAE	Exclude from analysis	1	Exclude from analysis	LAE
1828	JMY	8/9/2021	4	Y	uniqueID not entered into database	3	EGT	LAE	Enter into database	1	Entered into database	LAE
-9999	ERW	8/10/2021	1	Y	uniqueID recode	3	EGT	LAE	Recode to "-9998"	0	Recoded to -9998	LAE
-9999	ALL	9/11/2021	1	Y	uniqueID recode	3	EGT	LAE	Recode to "-9997"	0	Recoded to -9997	LAE

QC of lab data entry

Project Manager/Lab Manager opens codebook; filename: surveyname_codebook_exportdate.docx, saved location: Survey->Data->Qualtrics>Codebook and formats codebook Word document for ease of readability for undergraduates (save as “_formatted” under Codebook folder).

1. Reduce page breaks, fix table formatting for readability, add footer (including survey name and page number), bold Q#
2. Review to confirm response numbering is in order, highlight areas if incorrect, do NOT change.

Lab entry survey data were saved as Excel in Section 4.3.3 as filename: surveyname_uniqueID_QC_exportdate, Save location: Survey->Data->Qualtrics->QA_QC. Project Manager/Lab Manager copies this data file and renames (filename:surveyname_labentry_exportdate_QCworking.xlsx, save location: Survey->Data->Qualtrics->QA_QC

Project Manager/Lab Manager makes changes to the _QC working file that were identified in the uniqueID_QC worksheet and initials last column of worksheet once completed.

Project Manager/Lab Manager adds additional columns to the end.

4. “QC_personnel”: initials of lab personnel performing the QC
5. “QC_comments”: any comments/concerns/issues noted by QC personnel
6. “QC_resolution”: describe changes made to address the QC_comments
7. “n_errors”: number of changes made to address the QC_comments

Project Manager/Lab Manager sorts spreadsheet according to uniqueID, lowest to highest and conducts the following steps:

1. Use excel “Filter” to review columns for data anomalies (i.e. date or “code” formatting incorrect.) Highlight issues for QC.
2. Use excel “conditional formatting” to identify duplicate uniqueIDs. Highlight for QC.
3. Highlight rows in gray so QC_personnel knows which rows to QC. *Minimum 10%*.
 - a. Determine random 10% by inserting a blank column at far left, name it “random”, in first cell type “=randbetween(1,10), copy and paste special (choose values and number formats) back into the far left column. Filter response type column to show bad addresses and code them as “NA” in your random column. Then filter your random column for each number 1-10 and find one that is at least your 10%. Then highlight gray.

Project Manager/Lab Manager prepares the spreadsheet for undergraduate review.

1. Use excel “Hide” function to hide the columns that the undergrads do not need to review for the QC. Do NOT delete them.
2. Use excel “Protect” function to lock columns that should not be changed. Highlight the columns that will be reviewed for QC, then right click. Choose Format Cells, click Protection tab and uncheck “Locked”. Under Review, click Protect sheet and enter a password.
3. Save file: Name:surveyname_exportdate_QCworking.xlsx; save location: Survey->Data->Qualtrics->QA_QC
 - a. If undergraduates will be working on QA/QC simultaneously, create multiple versions of the spreadsheet. Give each undergrad a file saved with “_initials”.

Project Manager/Lab Manager provides the formatted codebook and QA/QC spreadsheet to an undergraduate to begin the QA/QC review to ensure all data were entered correctly. Project Manager/Lab Manager should filter the spreadsheet on the grey highlighting to show the rows to be reviewed. Project Manager/Lab Manager must go through the Qualtrics output in the spreadsheet and explain how the question and response coding works within

the spreadsheet. Undergraduate reviewer begins with one row of data and compares the response to the coding in the formatted codebook. All fields will have either a response code, -99, 0, or NA.

1. Undergrads will indicate with “-99” if respondent didn’t answer question and NA if question didn’t apply to them.
2. When data were exported from Qualtrics, Project Manager/Lab Manager should have ensured that unanswered multi-value fields (“check all that apply”) that were seen by the respondent were coded as “0”. Undergrads will check this coding.
3. Undergrads mark what errors were found in the QC_comments. The Project Manager/Lab Manager will review this at the end of the 10% QC to determine if there is a systematic error occurring in the data entry. If a threshold of 2% or greater is found in a question during QC, then all responses to that question will be reviewed.

Upon completion of undergraduate review, Project Manager/Lab Manager reviews all QC notes to ensure all issues were resolved for the hardcopy surveys.

Once QA/QC is complete, save file.

Filename: surveyname_labentry_QCexportdate_QC_QCcompletedate.xlsx

Location: Survey->Data->Qualtrics->QA_QC

4.3.4 Finalize data set

Create one file of “raw data” containing the online respondent data and the lab entry QC file, if a hardcopy survey was used.

Project Manager/Lab Manager creates this file using the two data files located in Survey->Data->Qualtrics->QA_QC

Filenames: surveyname_online_exportdate.xlsx or surveyname_online_exportdate_QC_QCcompletedate.xlsx, and surveyname_labentry_QCexportdate_QC_QCcompletedate.xlsx

1. Add “source_file” column to the front of each spreadsheet and paste the file name.
2. Add “source” column to the front of each spreadsheet and indicate if the data are from “hardcopy” or “online”.
3. Merge data into single file.
4. Create final raw data set. This is a final raw file – **do not add any data to this file**. This is source data that is pre-cleaned needed for traceability. Save as csv and excel.

Filename: surveyname_combined_rawdata_precleaned_QCcompletedate(YYYYMMDD).xlsx

Location: Survey>Data>Qualtrics>QA/QC

5 Clean

Objective: Project Manager/Lab Manager creates final clean data file using merged finalized data. Clean data and create a “clean” file that is used for all analysis.

During the cleaning process it is important to remember: **NEVER DELETE DATA**. These instructions provide ways to indicate data are incorrect and provide a resolution.

The following steps outline the procedure to guarantee the data set is properly cleaned. Use the raw data file to begin the cleaning process:

Filename: surveyname_combined_rawdata_precleaned_QCcompletedate(YYYYMMDD).xlsx

Location: Survey>Data>Qualtrics>QA/QC

1. Sort spreadsheet according to uniqueID, lowest to highest.
2. Use “Trim” function in Excel data to remove erroneous spacing in data cells.
3. Create two columns to the far right in the spreadsheet; name one “keep” and the other “keep_resolution”. The “keep” column will be used to indicate if the whole survey should be excluded or not for calculating a response rate. **NOTE: “Keep” is not used to decide which survey data are used for analysis.** If a survey is for some reason deemed “bad” flag it here. Do NOT delete data. Enter 1=Good or 0=Bad. Explain the reason for excluding the data in the “keep_resolution” column. If there are geospatial data, consider adding “GIS_keep” column. Surveys returned with no completed responses are still “good” as far as responses go but are “bad” to use for geospatial analysis.
 - a. “Bad” responses that should be excluded include the following rationale:
 - No data in any of the fields.
 - Survey is a duplicate. If a survey was filled out by respondent online and on paper, twice online, or twice on paper, and we know is not a typo. In this case, code the first response “Good” and the second response “Bad”. The Project Manager and Lab Manager may choose to code a later response as “Good” if the later response is more complete than the first response.
 - Survey was not found
 - Respondent is under 18 years old
 - Test data that were not deleted before the survey was distributed
4. Create “Clean_comments” and “Clean_personnel” columns to the far right in the spreadsheet for any comments to explain why data are modified from raw file during the cleaning process. Traceability is important.
5. If a survey was received with an illegible or removed uniqueID, it was given a uniqueID of “9999” during the log in process. If there are multiple surveys with the uniqueID “9999”, recode each survey to have a uniqueID starting with “-9999, -9998, -9997”, etc.
6. Check for duplicate “survey IDs” from lab entry and online respondent entry. If duplicates exist, confirm that lab entry of the hardcopy return is correct. If duplicate is due to respondent entry error indicate that it in the “Clean_comments” column. Data are still good unless using for GIS analysis in which case both are bad since we don’t know which respondent is correct.
7. Review all “data_entry_notes” and “additional_respondent_comments”. Clean data accordingly.
 - a. If comment fields indicate that mistakes were made entering responses, make the corrections and note correction in “Clean_comments” column.
8. Confirm data type by fieldname. Using the codebook, ensure that each column contains the correct numeric code. If the column is text or number entry, ensure that all entries are text or numeric, respectively.
7. If data errors exist in numeric fields, create qualifier field “_QUAL” to the right of the data field. In this new field you would have the cleaned responses. For example, if the response for Q10 was “~100”, change to “100” in the Q10_QUAL column. If a range is entered, change to -99.
8. Make the gender field consistent. Create qualifier field “_QUAL” to the right of the data field. In this new field you would have cleaned responses. For example, if the response for Gender is “M”, change to “male” in the _QUAL column.
9. If the question indicates the respondent should “enter a zero, if none” and the respondent wrote in “none,” enter “0”.
10. No cell should be left empty: For questions that were seen by the respondent but left unanswered add “-99”. Any responses left unanswered because the respondent did not see them are coded as “NA”. An example is questions skipped due to skip patterns.
11. Correct typos in text fields. Excel has a spell check function

12. Save final clean data file.
 - a. Filename: surveyname_combined_clean_cleandate(YYYYMMDD).xlsx
 - b. Location: Surveys->Data->Analysis->Final_csvs
13. Create csv of final dataset.
 - a. Filename: surveyname_combined_clean_cleandate(YYYYMMDD).csv
 - b. Location: Surveys->Data->Analysis->Final_csvs
14. Add metadata worksheet to cleaned data file and save. (see filename: Template_survey_metadata_20230814.xlsx for format). Metadata should also track any occurrences that deviate from this protocol.
 - a. Filename: surveyname_combined_clean_metadata_cleandate(YYYYMMDD).xlsx
 - b. Location: Surveys->Data->Analysis->Final_csvs
15. Create a complete merged data file for the survey: Combine the clean data file (.xlsx) with the tracking file. All uniqueIDs from the tracking file should include Response_type=3 and Keep=1.
 - a. Filename: surveyname_combined_hardcopy_online_tracking_clean_cleandate(YYYYMMDD).xlsx
 - b. Location: Surveys->Data->Analysis->Final_csvs

5.1 Sanitize

Before a data set can be viewed by anyone not included on the IRB protocol, the data must be sanitized to remove all personal information.

Using the complete merged data file

(Filename: surveyname_combined_hardcopy_online_tracking_clean_cleandate(YYYYMMDD).xlsx; Location: Surveys->Data->Analysis->Final_csvs), review all text fields for respondent personal information: If respondents leave their name, phone number, email address or address in the comment section or anywhere else on the survey, **do not** type in this personal information online. Instead, type “[NAME]” or “[ADDRESS]” etc. where the text would be. Examples: “Please send the results of this survey to [NAME] at [ADDRESS];” “My neighbor [NAME] is constantly stealing my turtles.”

Save sanitized data file.

Filename: surveyname_combined_hardcopy_online_tracking_sanitized_sanitizeddate(YYYYMMDD)

Location: Surveys->Data->Analysis->Final_csvs

6 References

Dillman, D.A., Smyth, J.D., and Christian, L.M. 2014. *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. Hoboken, NJ: John Wiley & Sons.

Appendix A

The NRSS Lab uses standard nomenclature for some field names and questions in Qualtrics. Do not use spaces rather use an underscore or start the fieldname with a numeric. These fieldnames will be the column headers in your data export.

Standard fieldnames	Standard question language
data_entry_personnel	What are the initials of the person entering these data?
date_received	What is the date the survey was received? (see date stamp on survey, type MM/DD/YYYY)
uniqueID	What is the 4 digit code provided to you in the letter or on the first page of the questionnaire? This will indicate that you completed the survey and we will stop sending reminders.
receipt_type	Indicate the type of response received; survey, phone call, email, other (specify).
phone_call_personnel	What are the initials of the person collecting these data over the phone?
response_type	<p>Survey Response Type: Please indicate the response type for this survey:</p> <ul style="list-style-type: none"> • Complete: survey has at least one question answered by the respondent, unless response in the final comment box is a refusal. • Duplicate: survey is a duplicate of an already completed survey. • Refusal: survey respondent refused to complete the survey. • Bad Address: survey was returned unopened because it could not be delivered by the post office.
section_i	SECTION I – [enter subject here]
thank_you	Thank you. Please share any additional thoughts, comments, or suggestions on this survey or our research on agricultural diversification.
add_respondent_notes	<p>Additional respondent comments: Please indicate any additional comments respondents entered on the survey (e.g., in the margins, next to responses, etc.) Enter all comments in quotes.</p> <p>Please enter in the following format: [pg 13, Q21 arrow from Q21 to margin]: "Of course climate changes"; [pg 3, Q7 in margin]: "maybe"; [pg 10, Q12 crossed out answers]: "NA"</p> <p>If none, enter NA</p>
data_entry_notes	<p>Data entry notes: Please indicate any data entry notes/comments/problems here (e.g., illegible handwriting, multiple answers to one question, circles, arrows, etc.)</p> <p>Below are examples for: - respondent who gives more than one answer for a question, - illegible handwriting, and - respondent who did not follow the skip pattern for the U2U tools</p> <p>Please enter your comments in the following format: [pg 10, Q18.d]: responded "not true for either" and "equally true for both"; [pg 14, Q24]: illegible handwriting; [p15, Q30]: circled PhD; [pg 7, Q12.a-e]: ignored skip pattern in 12.a and answered subsequent questions, 12.b "No, and I don't plan to", 12.c "Another tool provides this information", 12.d "I didn't understand this tool", 12.e "No";</p> <p>If none, enter NA</p>