

Responsive Management



SURVEY OF RESIDENTS OF THE PIKE CREEK WATERSHED REGARDING ATTITUDES TOWARD AND BEHAVIORS AFFECTING WATER QUALITY

**Conducted for the Delaware Department of Natural Resources and
Environmental Control**

by Responsive Management

2004

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EXECUTIVE SUMMARY

INTRODUCTION AND METHODOLOGY

This study was conducted for the Delaware Department of Natural Resources and Environmental Control (DNREC) to determine the opinions on and behaviors affecting water quality among Delaware residents who live in the vicinity of Pike Creek. The study entailed a telephone survey.

For the survey, telephones were selected as the preferred sampling medium because of the universality of telephone ownership. The telephone survey questionnaire was developed cooperatively by Responsive Management and the DNREC. Responsive Management conducted a pre-test of the questionnaire, and revisions were made to the questionnaire based on the pre-test. Interviews were conducted Monday through Friday from 9:00 a.m. to 9:00 p.m., Saturday noon to 6:00 p.m., and Sunday from 3:00 p.m. to 7:00 p.m., all local time. The survey was conducted in December 2003. A total of 409 completed interviews were obtained.

The software used for data collection was Questionnaire Programming Language 4.1. The analysis of data was performed using Statistical Package for the Social Sciences software. The results were weighted so that the proportions of the sample among the various Census tracts matched the distribution of the population in the Census tracts in the study area. Throughout this report, findings of the telephone survey are reported at a 95% confidence interval. For the entire sample of households in the Pike Creek area, the sampling error is at most plus or minus 4.74 percentage points.

LOCATION AND NAME OF NEAREST STREAM

- A slight majority of respondents (56%) indicated that a stream was within the development in which they lived, and 9% had a stream that was on or adjoined their property.

- Although respondents most commonly could not name the closest stream to their residence, nearly a third (31%) said the closest stream was White Clay Creek; 13% said Pike Creek.

WATER QUALITY IN NEAREST STREAM, AND OVERALL IMPRESSION OF THE NEAREST STREAM

- Respondents most commonly (32%) rated the water quality of the nearest stream to their residence as good; however, a substantial percentage (31%) rated it fair or poor.

- A plurality of respondents (43%) said their general impression of the nearest stream and its surrounding area was positive; 16% said it was negative. Of those who said it was positive, their main reasons for their positive impression were that the water is clean (56% gave this answer) and the vegetation is attractive (22%). Of those who said it was negative, their main reasons for their negative impression were that the water is polluted (70%) or that it floods (25%).

EFFECTS OF YARD AND YARD MAINTENANCE ACTIVITIES ON STREAM QUALITY

General Questions

- An overwhelming percentage of respondents (91%) have a yard as part of their property. Of those who have a yard, 99% said their yard area includes a lawn, 98% said the area includes trees and shrubs, 89% said it includes flower beds, and just over a third (37%) said it includes a food garden.

- Two thirds (67%) said that they take care of their lawn and landscaping themselves; 19% said they hire someone, and 15% said, “Both” (this works out to 82% who work on their lawn themselves at least some of the time and 34% who hire someone to landscape at least some of the time). The most common lawn-care problems cited were weeds and maintaining a green lawn.

Considerations When Planning Yard Care Maintenance

- Respondents were asked about four considerations when planning their yard and associated yard-care maintenance. A highly groomed appearance had the greatest percentage answering that it was very or somewhat important (88%), followed by the cost involved (81%), then the degree of difficulty (74%) and the time involved (73%).

Fertilizers

- Nearly two-thirds of those who hire someone else to landscape/maintain their yard at least some of the time (62%) have the hired landscapers apply fertilizers and/or pesticides to the yard, and nearly an equal percentage of those who take care of their own lawn at least some of the time (60%) apply fertilizer to their lawn. The mean of the number of times that those who work on their own yard at least some of the time apply fertilizer is 2.24 times per year. Most commonly, those who apply fertilizer to their lawn do so in the spring or fall.

Disposal/Use of Grass Clippings and Other Yard Waste

- Just more than a third of respondents (35%) take care of grass clippings using a self-mulching mower, while 26% use grass clippings as mulch on plant beds; 25% dispose of grass clippings in the garbage pickup.
- A substantial percentage of those who have a yard (42%) put leaves out for garbage pickup, while 25% use as mulch on plant beds and 20% compost them.
- A majority of those who have a yard (64%) put other yard waste (i.e., other than grass clippings or leaves) out for garbage pickup, while 22% compost it.

USE OF STREAM BANKS AND THE EFFECTS ON WATER QUALITY

- Most respondents did not have a stream on their property, although 7% did. Most of those who have a stream on their property leave the stream bank in a natural state, but 24% maintain the stream bank. When asked to characterize the stream bank on their property, the overwhelming majority (78%) said the stream bank is left in a natural state.
- Respondents were asked about seven possible hindrances to their planting a border along the stream on their property. The top answers of major hindrances were that a border would block the view of the stream (20%), the cost involved (19%), or having to rake leaves (15%). Not knowing how to choose plants or not knowing where to get plants were the top items deemed not to be a hindrance.

MANAGEMENT OF STORMWATER RUNOFF

- While 37% of respondents said that their neighborhood contains no stormwater structures and 22% did not know, 17% identified storm drains/sewers/gutters, 13% identified stormwater ponds, and 9% identified swales.

- Of those who indicated that their neighborhood contains a stormwater structure, nearly half (46%) said that their county maintains them.

- Respondents most commonly thought that stormwater flows directly into local streams (48%), followed by those who thought stormwater runoff is collected and sent to the wastewater treatment plant (21%).

- Respondents were asked about whether they support eight items or actions relating to water quality. The items/actions that topped the list were constructed wetlands (73% strongly or moderately supported), limiting paved areas (65%), stormwater ponds/basins (63%), and rain gardens (62%).

- Respondents were asked about four possible actions that they could take that would help protect water quality. None of the actions had a majority saying that they would be very or somewhat likely to do the action. The top actions were adopt a storm drain (42% would be very or somewhat likely to do this) and install a rain barrel to catch roof runoff (42%), followed closely by wash their car at a carwash instead of at their property (41%). Sweep the curb was the last action (38%). The action that respondents most commonly already do is adopting a storm drain (10% do this) and installing a rain barrel to catch roof runoff (also 10%).

- Roughly two-thirds of respondents (67%) said that they would be willing to pay \$2 per month to pay for necessary improvements to stormwater runoff facilities to protect water quality; 19% would not be willing.

CAR WASHING AND WATER QUALITY

- A plurality of respondents (46%) wash their car at a carwash only (i.e., never at home). The next most common answer is that they wash their car both at a carwash and at home (29%); 23% wash their car exclusively at home. A majority of those who did not wash their car exclusively at a carwash would be likely to wash their car at a carwash if they received reduced-cost coupons to do so.

EFFECTS OF PETS ON WATER QUALITY

- A little more than a fifth of respondents (21%) own a dog that they take on walks through their neighborhood. The overwhelming majority (91%) of those who own a dog that they take on walks through their neighborhood clean up their pet's waste on the walk. Despite this high percentage who already clean up after their dog, 77% said that they would be more likely to clean up their pet's waste if facilities were provided (including pet waste bags) along the route.

SEWER AND SEPTIC SYSTEMS AND THEIR EFFECTS ON WATER QUALITY

- A very large majority of respondents (83%) indicated that their residence is on a sewer system; 15% said their residence has a septic system, a cesspool, or a seepage pit. Of those not on a sewer system, 42% would like to be on one, while 31% do not wish to be on one. Those not wishing to be on a sewer system cited the cost of switching or the water or sewage fees; however, if the cost of switching to a sewer system were partially defrayed, 60% said that they would be more willing to switch.
- Most respondents (66%) strongly or moderately agreed that owners of an on-site system (e.g., a septic system) should be required to fix problems with the system, possibly at their own expense, if it were shown that the system does not meet state standards and that water quality was being negatively affected by the on-site system. If homeowners had to pay only part of the cost of fixing the aforementioned problem themselves, an even greater percentage agreed (76%) that homeowners should be required to fix the problem.

TYPES OF POLLUTION AND THEIR PERCEIVED EFFECTS ON WATER QUALITY

- Respondents were asked about how much nine potential types of water pollution contribute to water pollution of the stream nearest their residence. Lawn chemicals had the greatest percentage (32%) saying it contributes a great deal to the water pollution of the stream nearest their residence, followed by discharges from industrial facilities (26%). Pet waste (8%) and septic systems (8%) had the lowest percentage saying that they contribute to water pollution of the stream nearest their residence.

PUBLIC INPUT TO HELP SHAPE STREAM AND WATER QUALITY, AND WAYS TO PROVIDE INFORMATION TO RESPONDENT

- Two-thirds (67%) would be interested in providing input to the DNREC regarding stream and water quality protection strategies.

- Regarding effectiveness of mediums to provide information to the respondent regarding water quality and ways to protect water quality, the greatest percentage of respondents said the following would be very or somewhat effective ways to provide them with information:
 - a civic association newsletter (79%),
 - newspapers (79%),
 - brochures mailed to the respondent's house (78%),
 - TV (77%),
 - radio (75%), and
 - schools (74%).

OPINIONS ON GENERAL STATEMENTS ABOUT NATURAL RESOURCES

- Respondents were asked about whether they agreed or disagreed with three statements about natural resources. A majority agreed (81%, with 57% strongly agreeing) that plants and animals have as much right to exist as humans do; lower percentages agreed that humans have the right to modify the natural environment to suit their needs (49%, with 12% strongly agreeing) or that humans were meant to rule over nature (39%, with 15% strongly agreeing).

NEIGHBORHOOD ASSOCIATION MEMBERSHIP, DEMOGRAPHIC DATA, AND HOUSING DATA

- A large majority of respondents (69%) were part of a neighborhood association.

- A majority of respondents (78%) lived in a single-family house.

- The overwhelming majority of respondents (83%) own their home.

- A plurality of respondents (43%) indicated that their home is more than 30 years old.

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INTRODUCTION AND METHODOLOGY

This study was conducted for the Delaware Department of Natural Resources and Environmental Control (DNREC) to determine the opinions on and behaviors affecting water quality among Delaware residents who live in the vicinity of Pike Creek. The study entailed a telephone survey. In the telephone survey, Responsive Management obtained 409 completed interviews. Specific aspects of the research methodology are discussed below.

For the survey, telephones were selected as the preferred sampling medium because of the universality of telephone ownership. In addition, a central polling site at the Responsive Management office allowed for rigorous quality control over the interviews and data collection. Responsive Management maintains its own in-house telephone interviewing facilities. These facilities are staffed by interviewers with experience conducting computer-assisted telephone interviews on the subjects of natural resources and outdoor recreation. The telephone survey questionnaire was developed cooperatively by Responsive Management and the DNREC. Responsive Management conducted a pre-test of the questionnaire, and revisions were made to the questionnaire based on the pre-test.

To ensure that the telephone survey data collected were of the highest quality, Responsive Management has interviewers who have been trained according to the standards established by the Council of American Survey Research Organizations. Methods of instruction included lecture and role-playing. The Survey Center Managers conducted project briefings with the interviewers prior to the administration of the survey. Interviewers were instructed on type of study, study goals and objectives, handling of survey questions, interview length, termination points and qualifiers for participation, interviewer instructions within the survey instrument, reading of the survey instrument, skip patterns, and probing and clarifying techniques necessary for specific questions on the survey instrument. The Survey Center Managers randomly monitored telephone workstations without the interviewers' knowledge to evaluate the performance of each interviewer. After the surveys were obtained by the interviewers, the Survey Center Managers and/or statisticians edited each completed survey to ensure clarity and completeness.

Interviews were conducted Monday through Friday from 9:00 a.m. to 9:00 p.m., Saturday noon to 6:00 p.m., and Sunday from 3:00 p.m. to 7:00 p.m., all local time. A five-callback design was

used to maintain the representativeness of the sample, to avoid bias toward people easy to reach by telephone, and to provide an equal opportunity for all to participate. When a respondent could not be reached on the first call, subsequent calls were placed on different days of the week and at different times of the day. The survey was conducted in December 2003. A total of 409 completed interviews were obtained.

The software used for data collection was Questionnaire Programming Language 4.1 (QPL). The survey data were entered into the computer as each interview was being conducted, eliminating manual data entry after the completion of the survey and the concomitant data entry errors that may occur with manual data entry. The survey instrument was programmed so that QPL branched, coded, and substituted phrases in the survey based on previous responses to ensure the integrity and consistency of the data collection. The analysis of data was performed using Statistical Package for the Social Sciences (SPSS) software. SPSS is a software package that is specifically designed for quantitative statistical analyses.

The study area was delineated by the DNREC. Responsive Management then identified the U.S. Census tracts that defined the study area and obtained the sample from among households in these identified Census tracts. The results were weighted so that the proportions of the sample among the various tracts matched the distribution of the population as a whole in each tract. The tabulation below shows the weighting factors.

Weighting Factors

Delaware Census Tract (New Castle County tracts in Pike Creek watershed area)	Number of Housing Units in Tract	Percent of All Study Area Houses Located in Each Tract	Actual Number Sampled in Tract	Sampling Error	Weighting Factor
Tract A (Tract A [13300])	779	8.33	81	10.31	0.42
Tract B (Tract B [13504])	2,651	28.36	82	10.66	1.41
Tract C (Tract C [13604])	1,624	17.37	86	10.29	0.83
Tract D (Tract D [13611])	2,552	27.30	80	10.79	1.40
Tract E (Tract E [13700])	1,741	18.63	80	10.71	0.95
Total	9,347	100.00	409	4.74	1.00

Note that n-values may sometimes appear to have discrepancies (i.e., the n-values of some graphs may appear to be off by 1). This is caused by the weighting, which in some cases led to

fractional values or “partial people.” Small differences in the fractional values for those “partial people” often lead to different rounded “whole people” values when reporting n-values in graphs. On other graphs, the n-value is lower than 409 because some questions were not asked of all respondents.

Throughout this report, findings of the telephone survey are reported at a 95% confidence interval. For the entire sample of households in the Pike Creek area, the sampling error is at most plus or minus 4.74 percentage points. This means that if the survey were conducted 100 times on different samples that were selected in the same way, the findings of 95 out of the 100 surveys would fall within plus or minus 4.74% of each other. Sampling error was calculated using the formula described below, with a sample size of 409 and a population size of 9,347.

Sampling error equation:

$$B = \left(\sqrt{\frac{N_p(.25)}{N_s} - .25} \right) \left(\frac{1.96}{N_p - 1} \right)$$

Where: B = maximum sampling error (as decimal)
 N_p = population size (e.g., total number of households)
 N_s = sample size

Derived from formula: p. 206 in Dillman, D. A. 2000. *Mail and Internet Surveys*. John Wiley & Sons, NY.

Note: This is a simplified version of the formula that calculates the maximum sampling error using a 50:50 split (the most conservative calculation because a 50:50 split would give maximum variation).

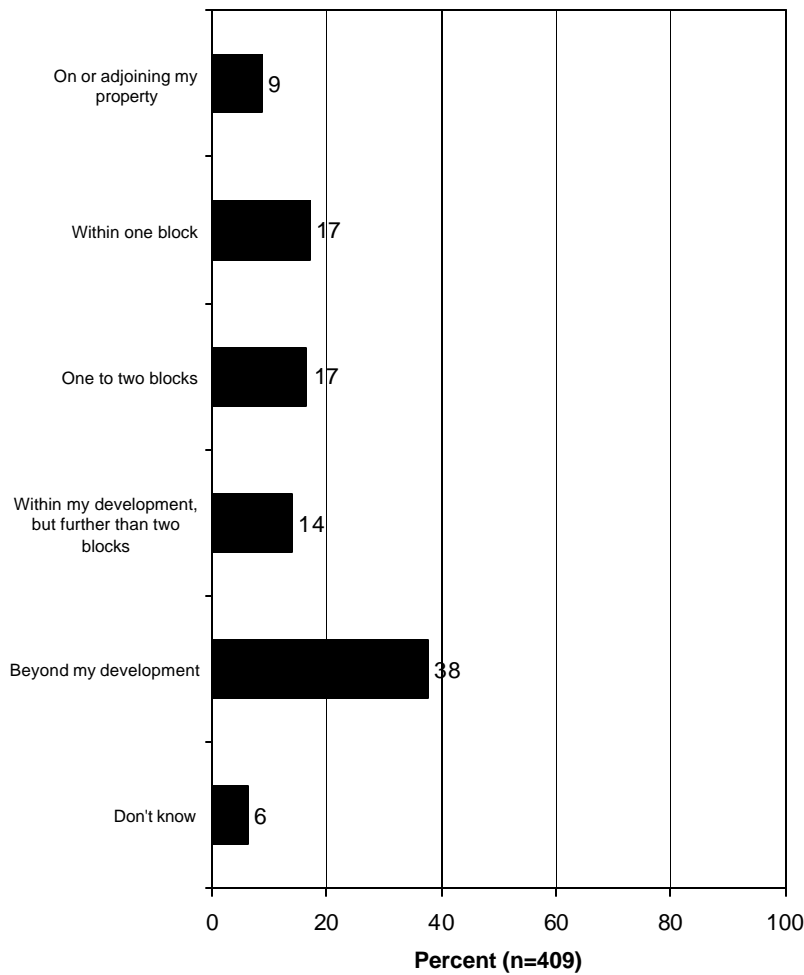
Note that some results may not sum to exactly 100% because of rounding.

LOCATION AND NAME OF NEAREST STREAM

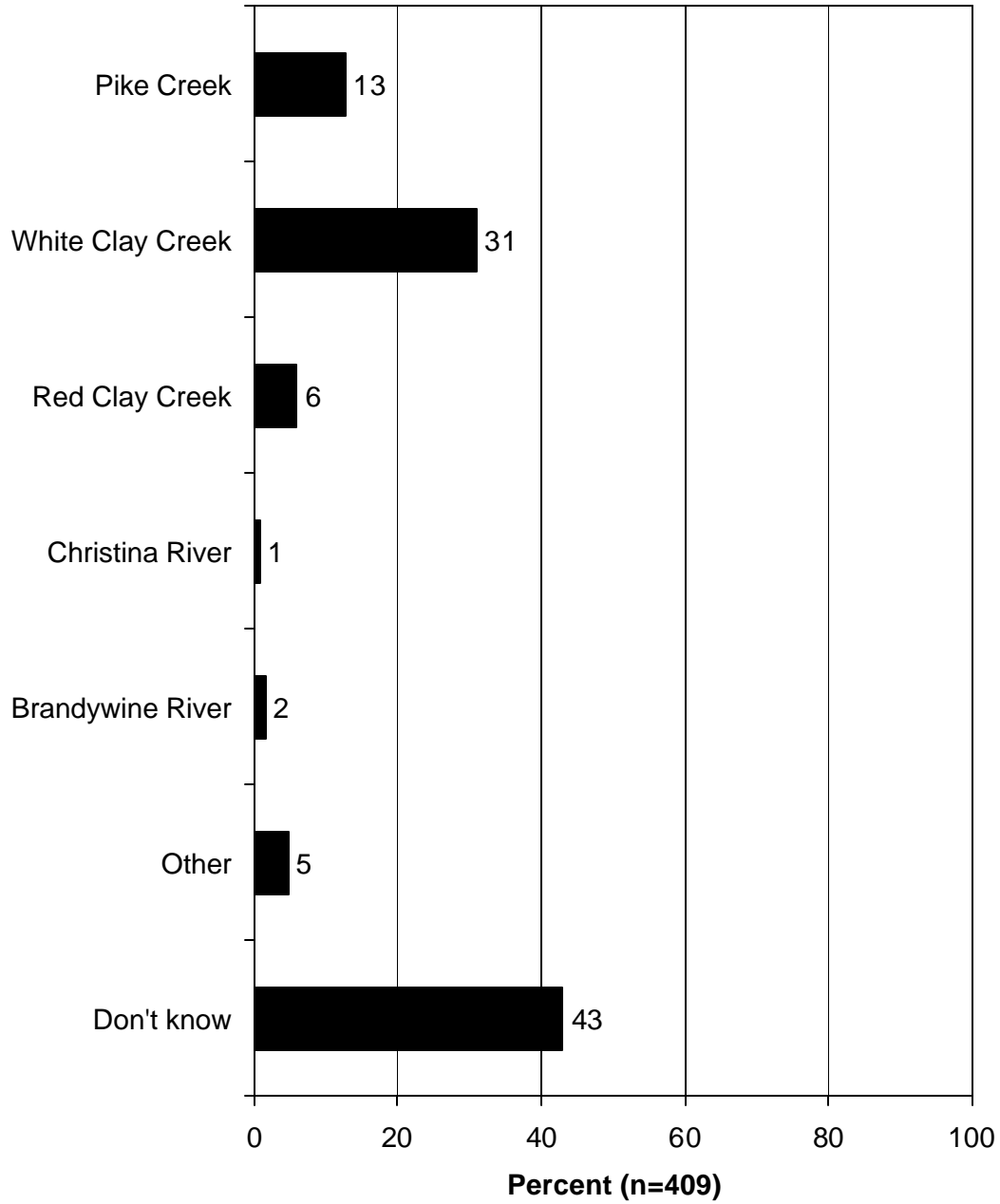
- A slight majority of respondents (56%) indicated that a stream was within the development in which they lived; 38% indicated that the closest stream was beyond their development.
 - 9% had a stream that was on or adjoined their property.

- Although respondents most commonly could not name the closest stream to their residence, nearly a third (31%) said the closest stream was White Clay Creek; 13% said Pike Creek.

Q15. How close to you is the nearest stream?



Q16. If you know, what is the name of the stream nearest you?

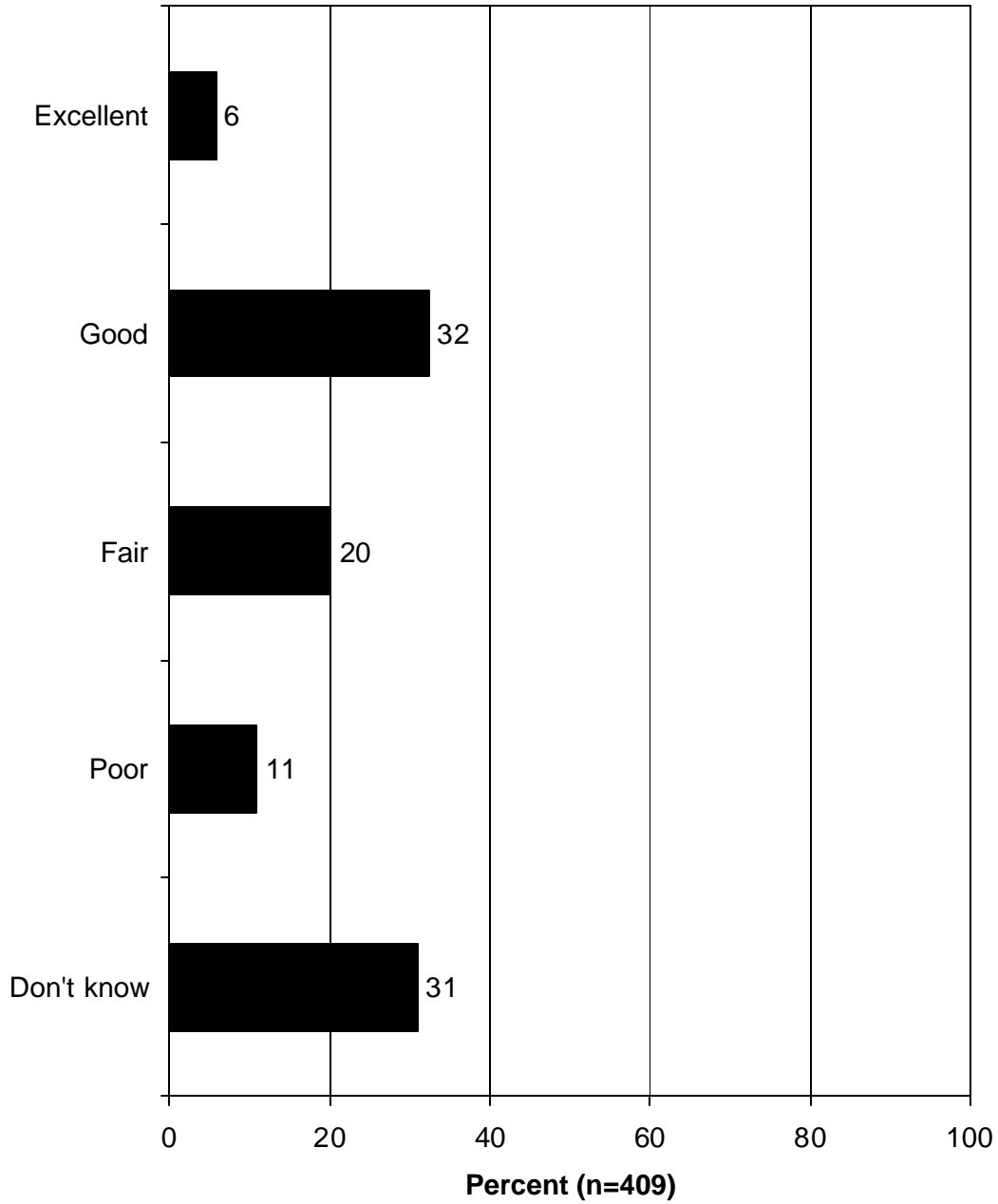


WATER QUALITY IN NEAREST STREAM, AND OVERALL IMPRESSION OF THE NEAREST STREAM

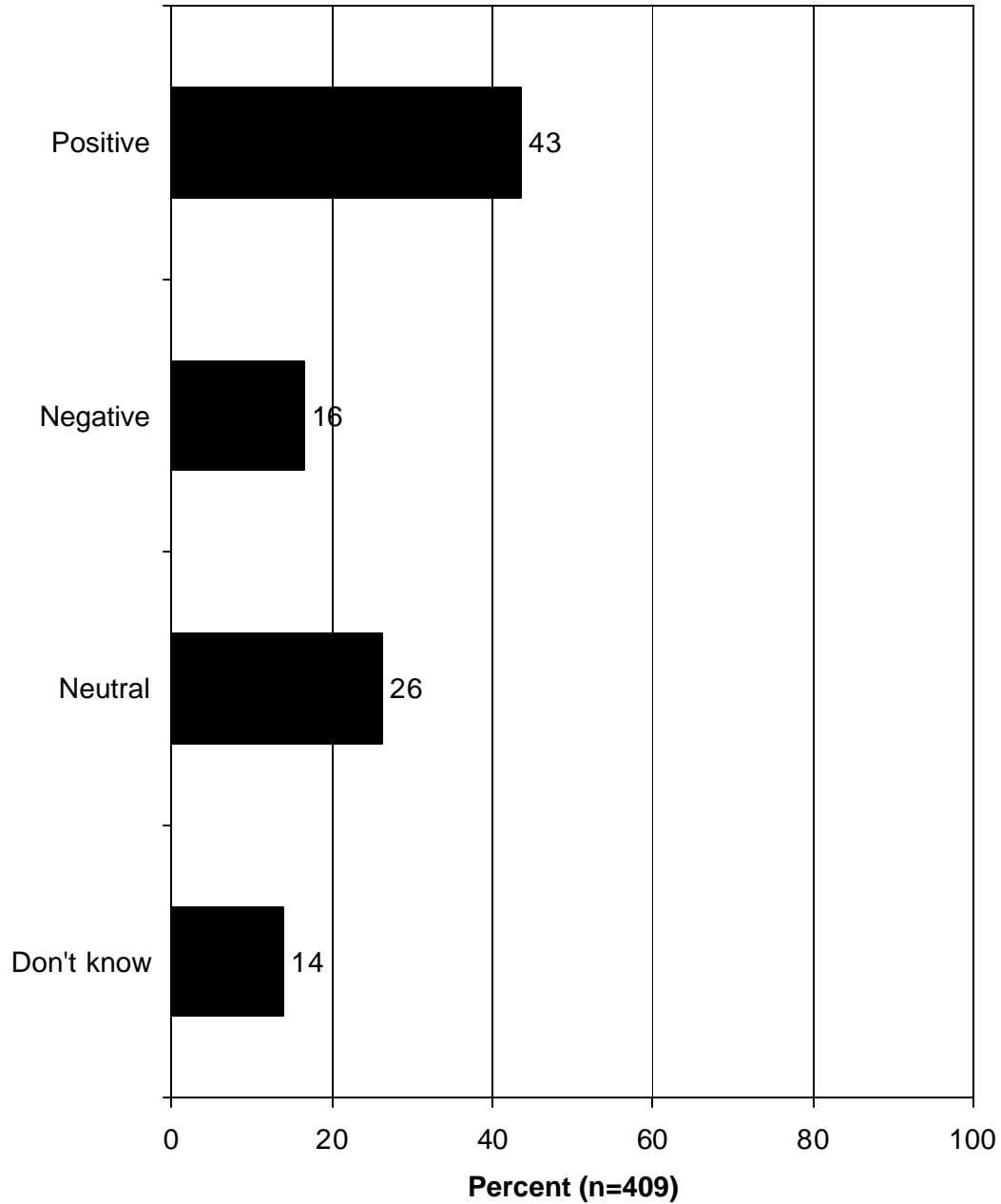
- Respondents most commonly (32%) rated the water quality of the nearest stream to their residence as good; however, a substantial percentage (31%) rated it fair or poor.
 - 6% rated it excellent.

- A plurality of respondents (43%) said their general impression of the nearest stream and its surrounding area was positive; 16% said it was negative. Of those who said it was positive, their main reasons for their positive impression were that the water is clean (56% gave this answer), that the vegetation is attractive (22%), that it is peaceful (16%), and/or that they like the fish and wildlife in/around the stream (13%). Of those who said it was negative, their main reasons for their negative impression were that the water is polluted (70%) or that it floods (25%).

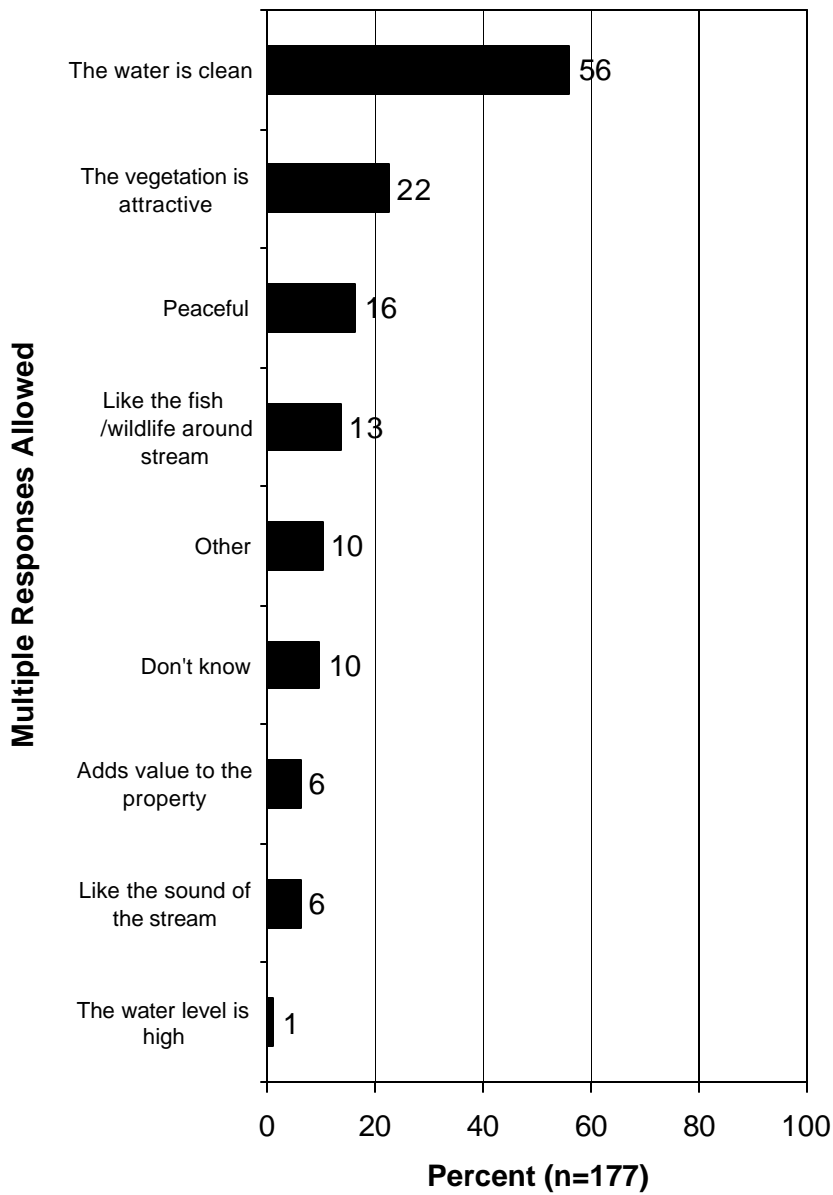
Q7. How would you rate the water quality of the stream nearest your residence?



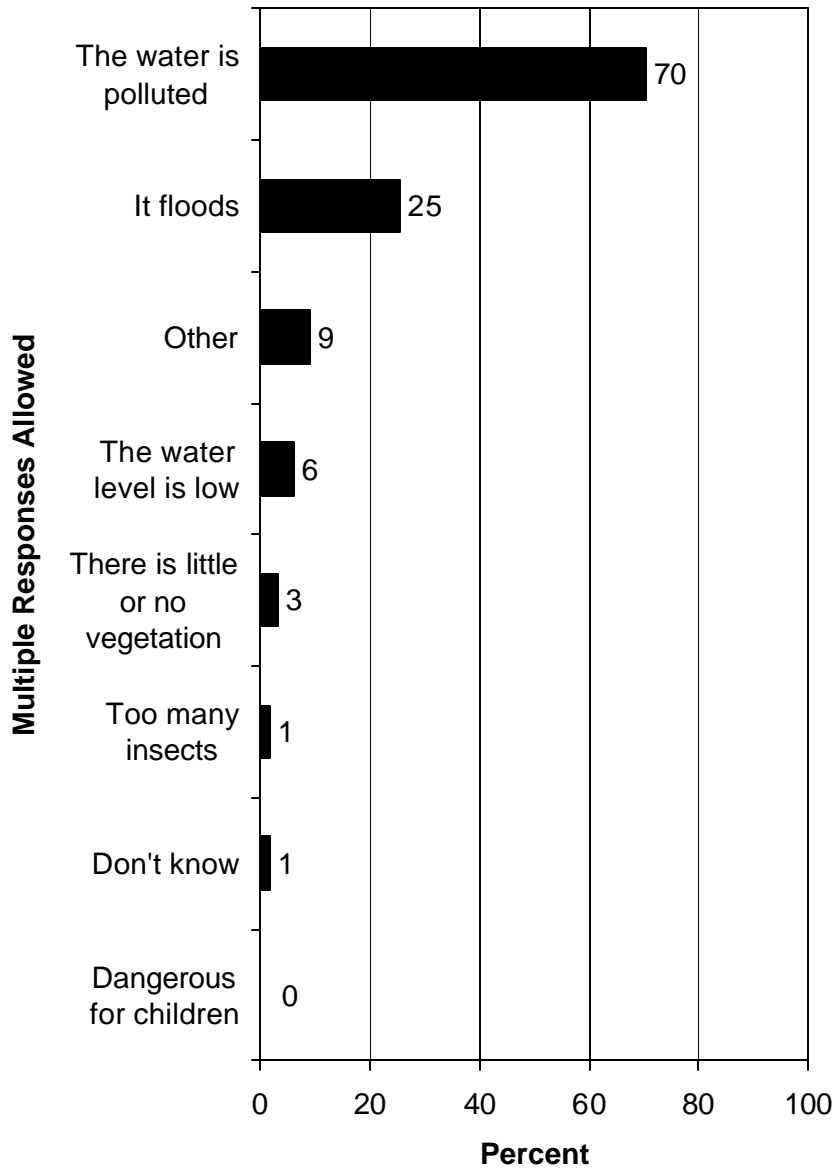
Q8. Now I want you to think about the stream nearest your residence and surrounding area as a whole. Would you say your general impression of this area is positive, negative, or neutral?



Q10. What are your main reasons for having a positive impression of the stream nearest your residence as a whole? (Asked of those who had a positive impression of the nearest stream to their residence.)



Q13. What are your main reasons for having a negative impression of the stream nearest your residence as a whole? (Asked of those who had a negative impression of the nearest stream to their residence.)



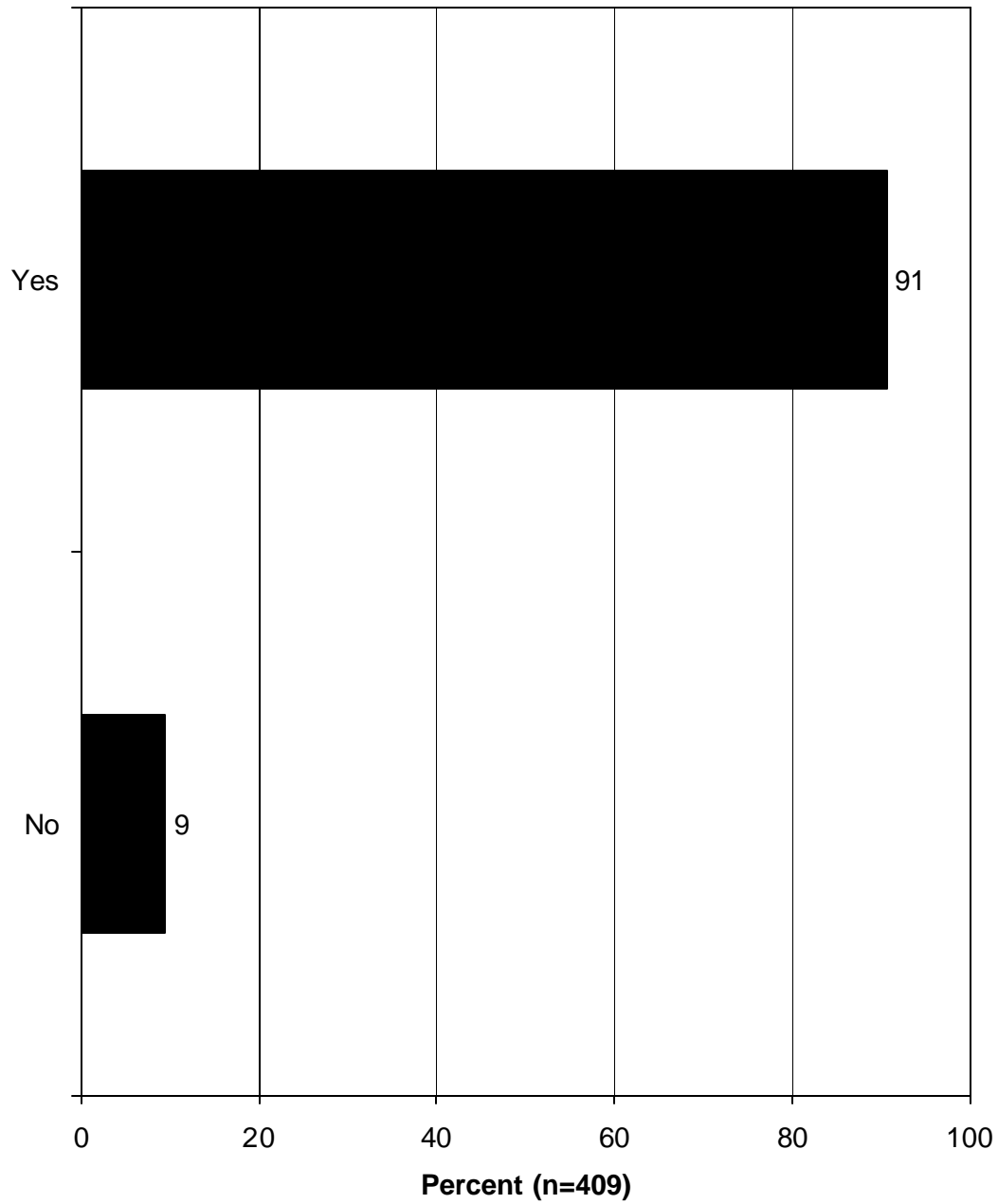
EFFECTS OF YARD AND YARD MAINTENANCE ACTIVITIES ON STREAM QUALITY

General Questions

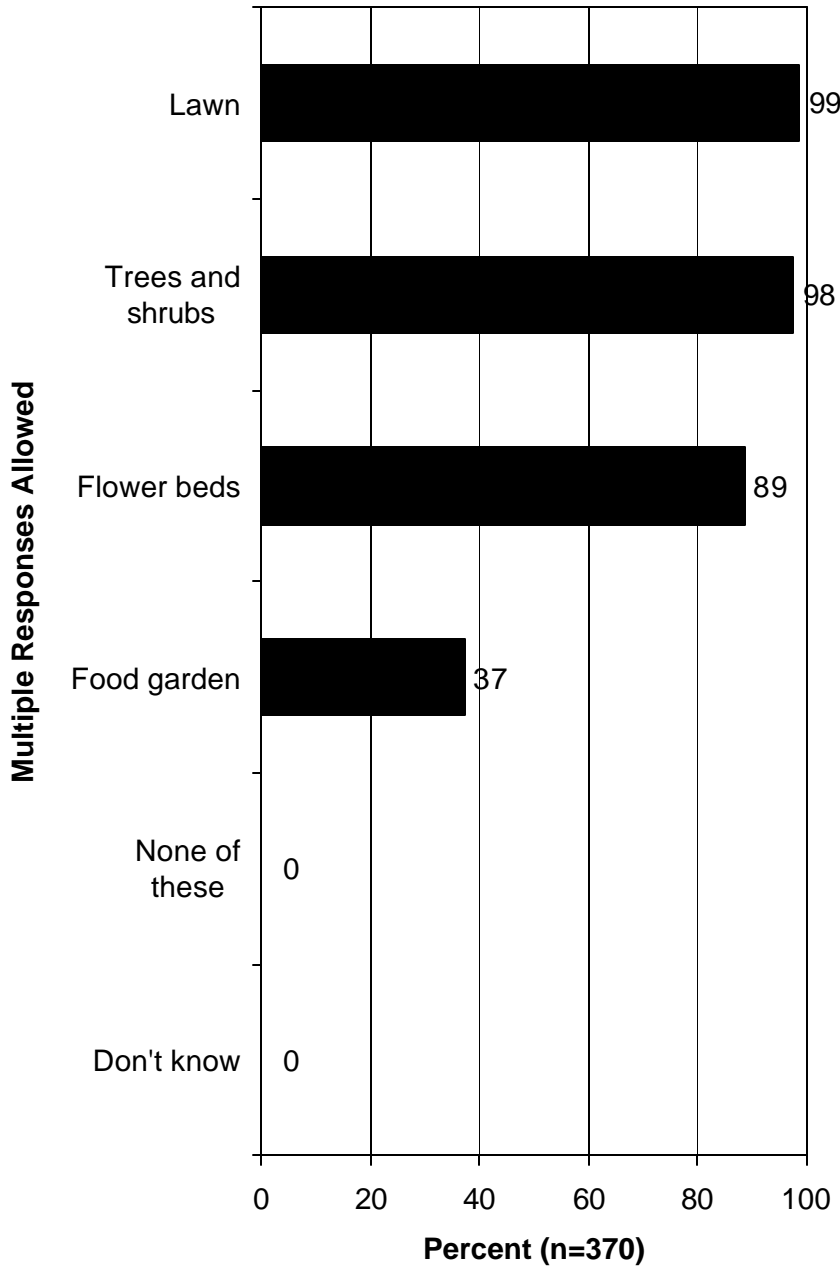
- An overwhelming percentage of respondents (91%) have a yard as part of their property. Of those who have a yard, 99% said their yard area includes a lawn, 98% said the area includes trees and shrubs, 89% said it includes flower beds, and just over a third (37%) said it includes a food garden. When those who have a yard were asked what (among a lawn, trees/shrubs, flower beds, and a food garden) takes up the most area of their property, the overwhelming majority (84%) said a lawn. Those who have a lawn most commonly said that they do not use it at all (36%), followed closely by those who say they use it for a play area for children (33%).

- Two thirds (67%) said that they take care of their lawn and landscaping themselves; 19% said they hire someone, and 15% said, “Both” (this works out to 82% who work on their lawn themselves at least some of the time and 34% who hire someone to landscape at least some of the time). The mean number of hours that respondents spent caring for their lawn (those who had a lawn) is 2.42 hours per week. Most of the respondents (61%) indicated that they enjoy taking care of their lawn a great deal or somewhat. The most common lawn-care problems cited were weeds and maintaining a green lawn. Additionally, an overwhelming majority (94%) said that it was very or somewhat important to them that their neighbors keep their property neat and well-groomed, with 63% saying it was “very important.”

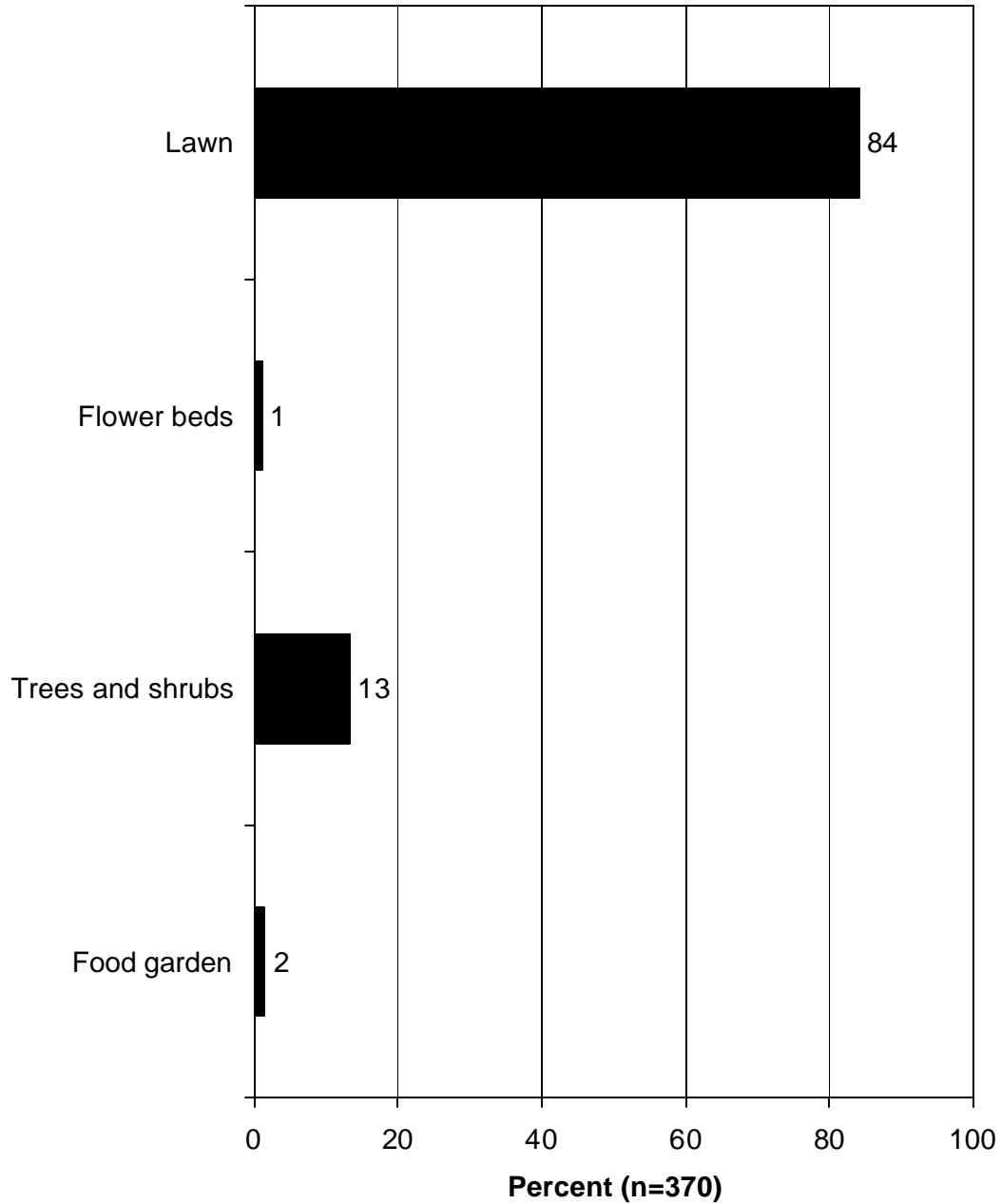
Q18. Do you have your own yard?



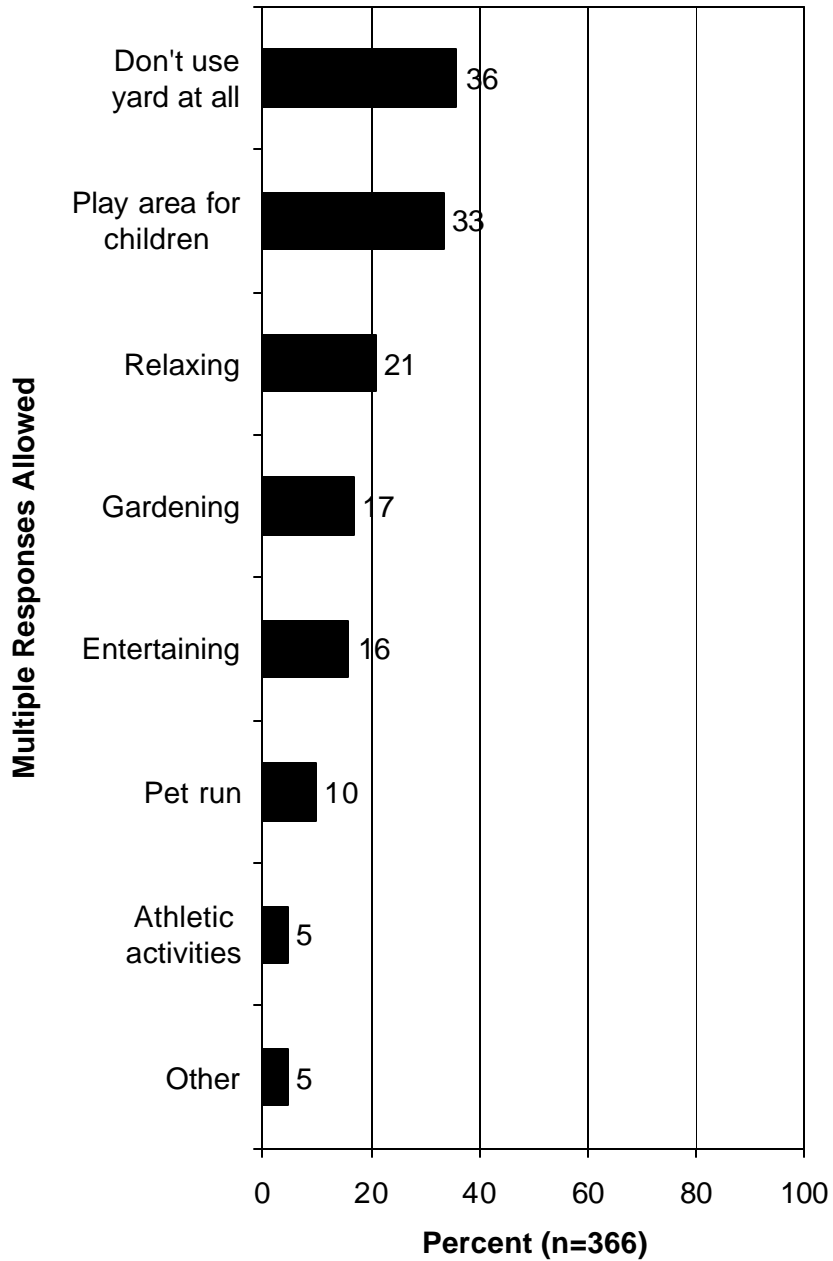
Q20. Please tell me if you have any of the following on your property (asked of those who have a yard):



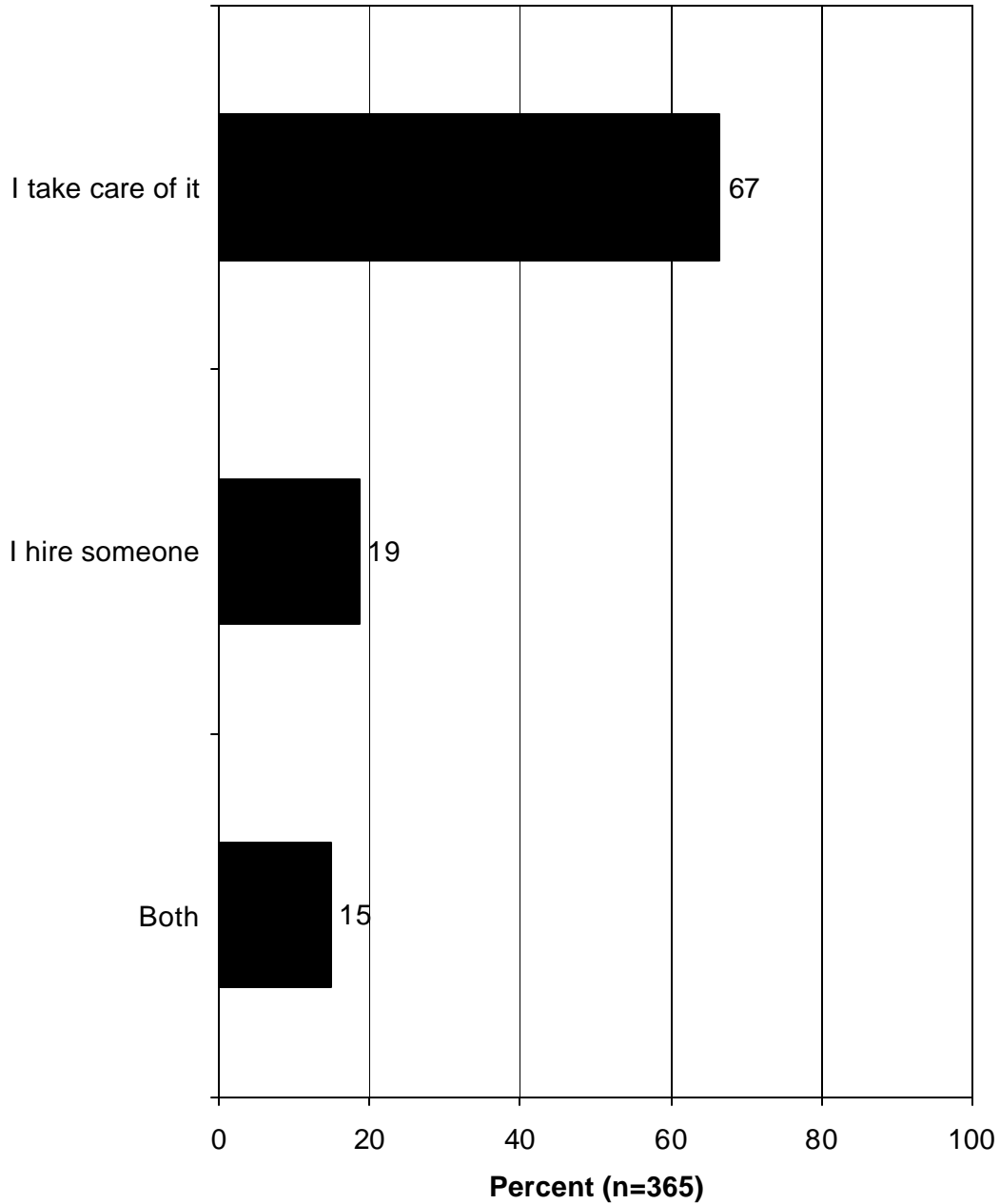
Q21. Which of those takes up the most area on your property? (Asked of those who have a yard that includes a lawn, flower beds, trees and shrubs, and/or a food garden.)



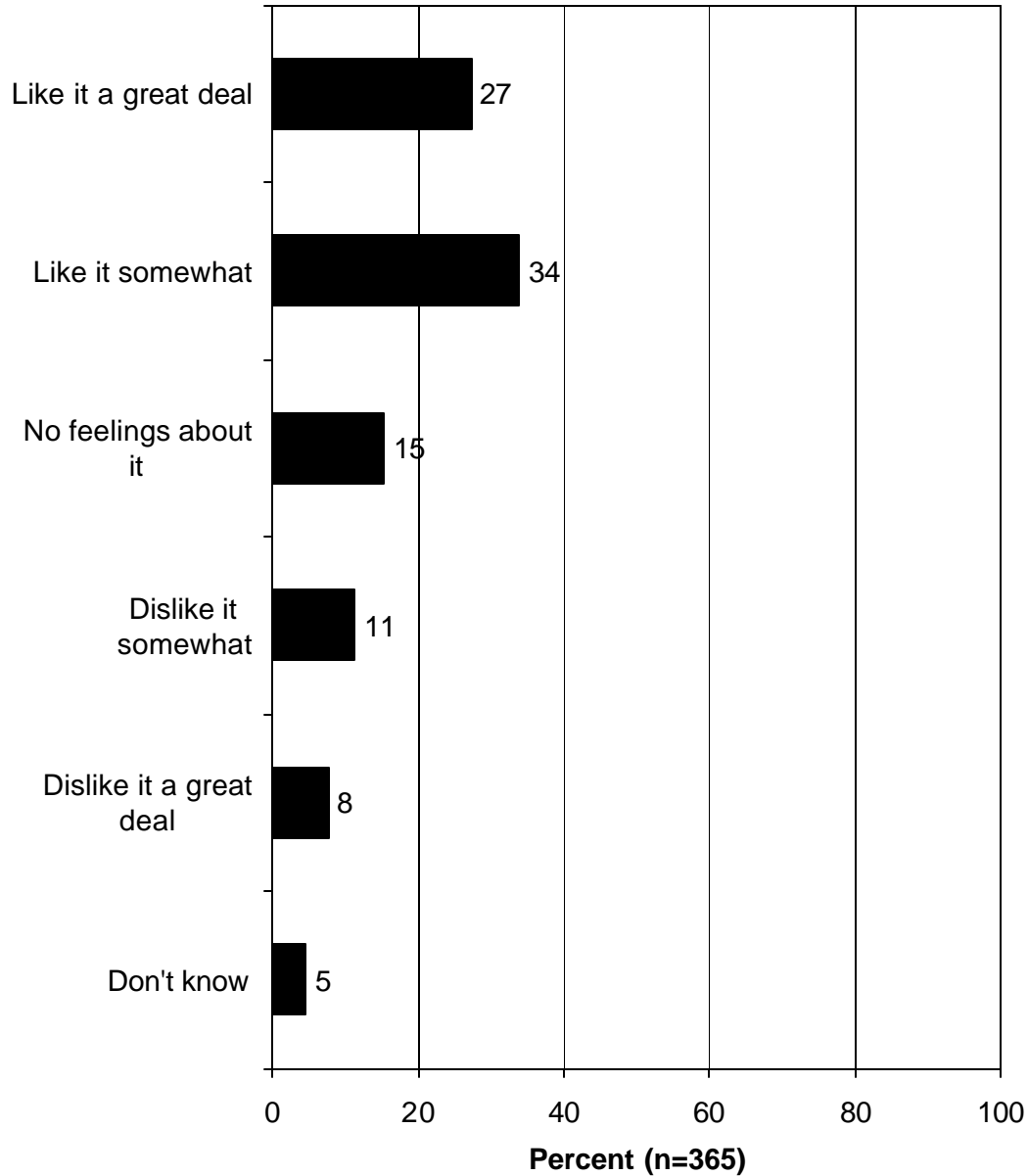
Q27. How do you use your lawn? (Asked of those who have a yard that includes a lawn.)



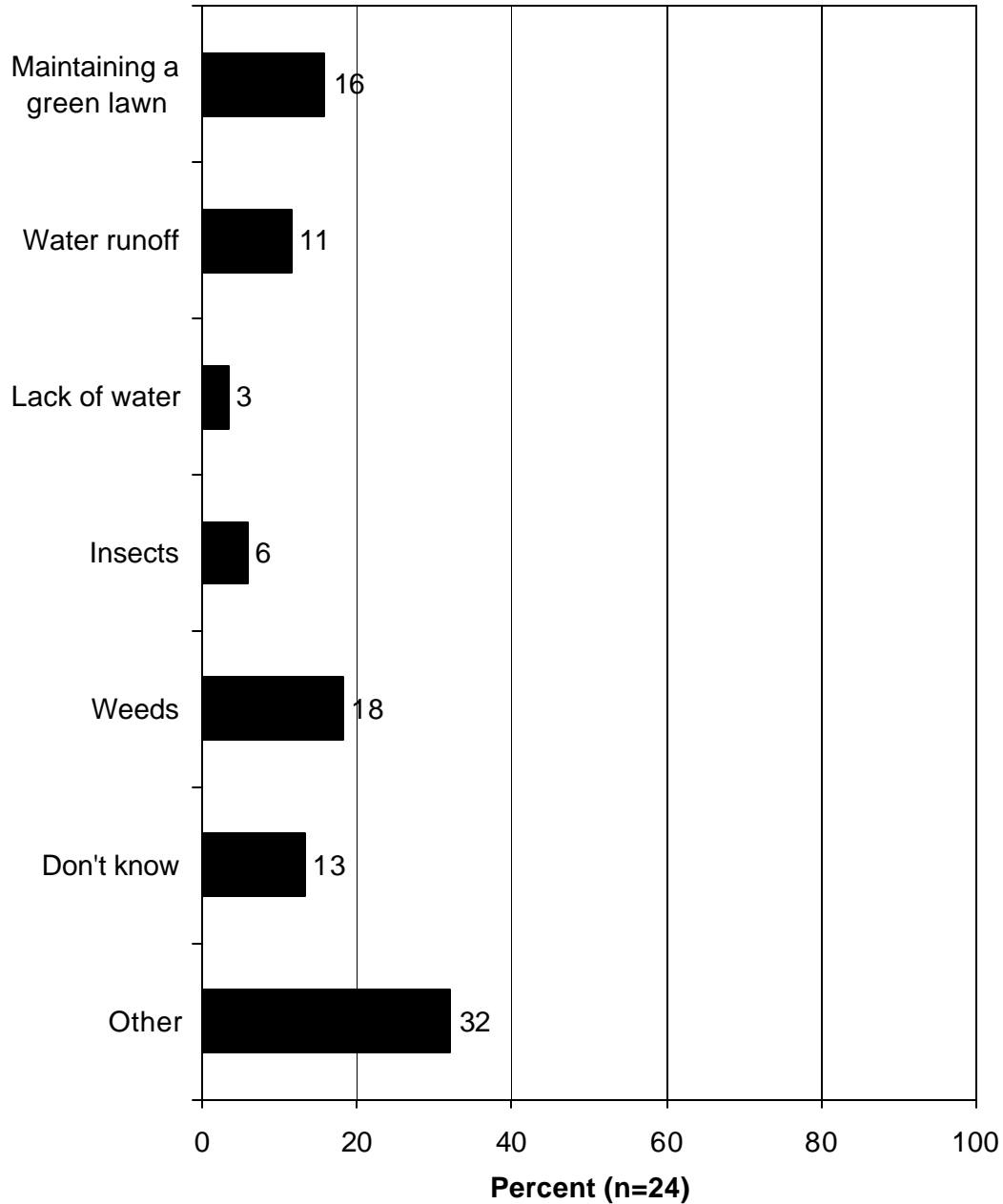
**Q29. Do you take care of your own lawn and landscaping, or do you hire someone to do it?
(Asked of those who have a yard.)**



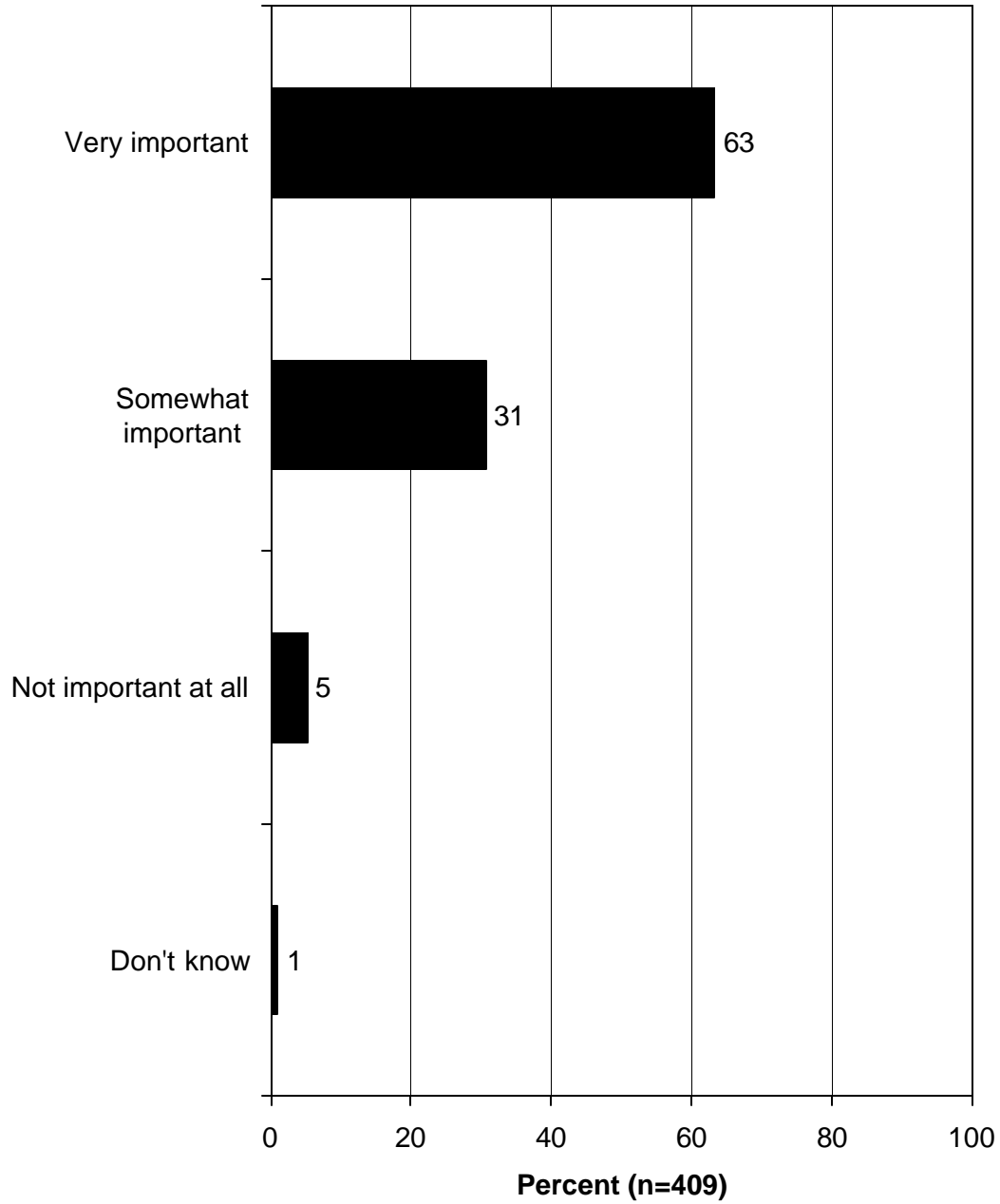
Q36. How much do you enjoy taking care of your lawn? Would you say you like it a great deal, like it somewhat, you have no feelings about it, you dislike it somewhat, or dislike it a great deal? (Asked of those who have a yard.)



Q49. What do you perceive to be your most important yard care problem? (Asked of those who have a yard and who answered, "Other," regarding what they do with yard waste.)



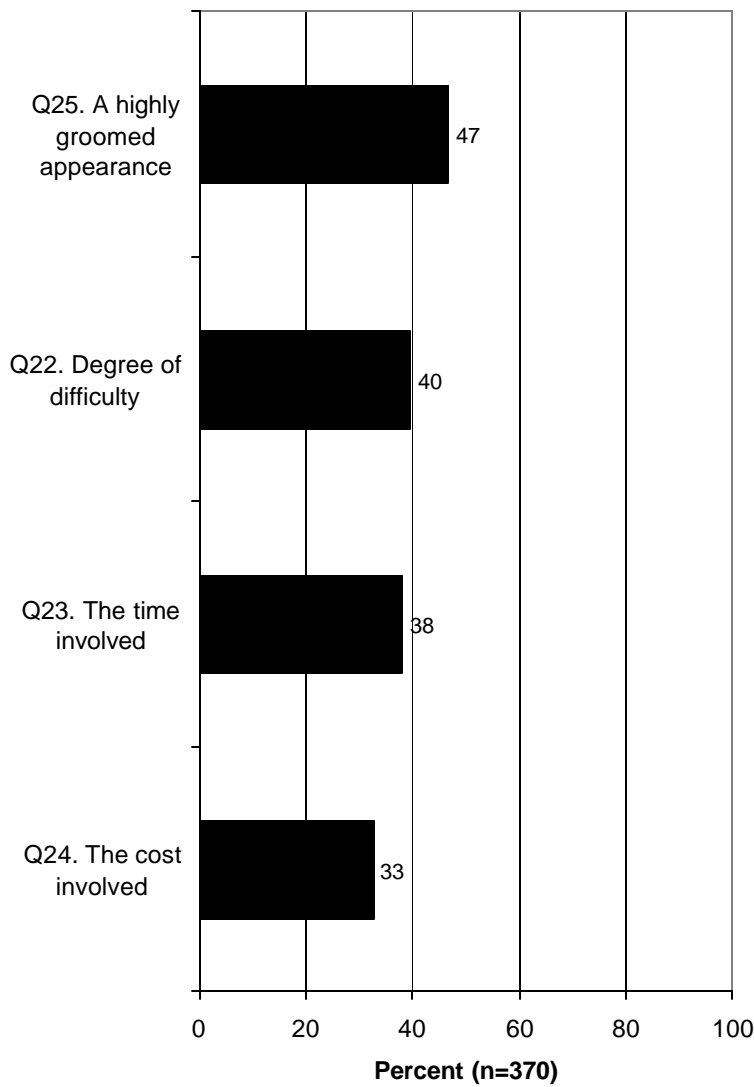
Q51. How important is it to you that your neighbors keep their property neat or well groomed?



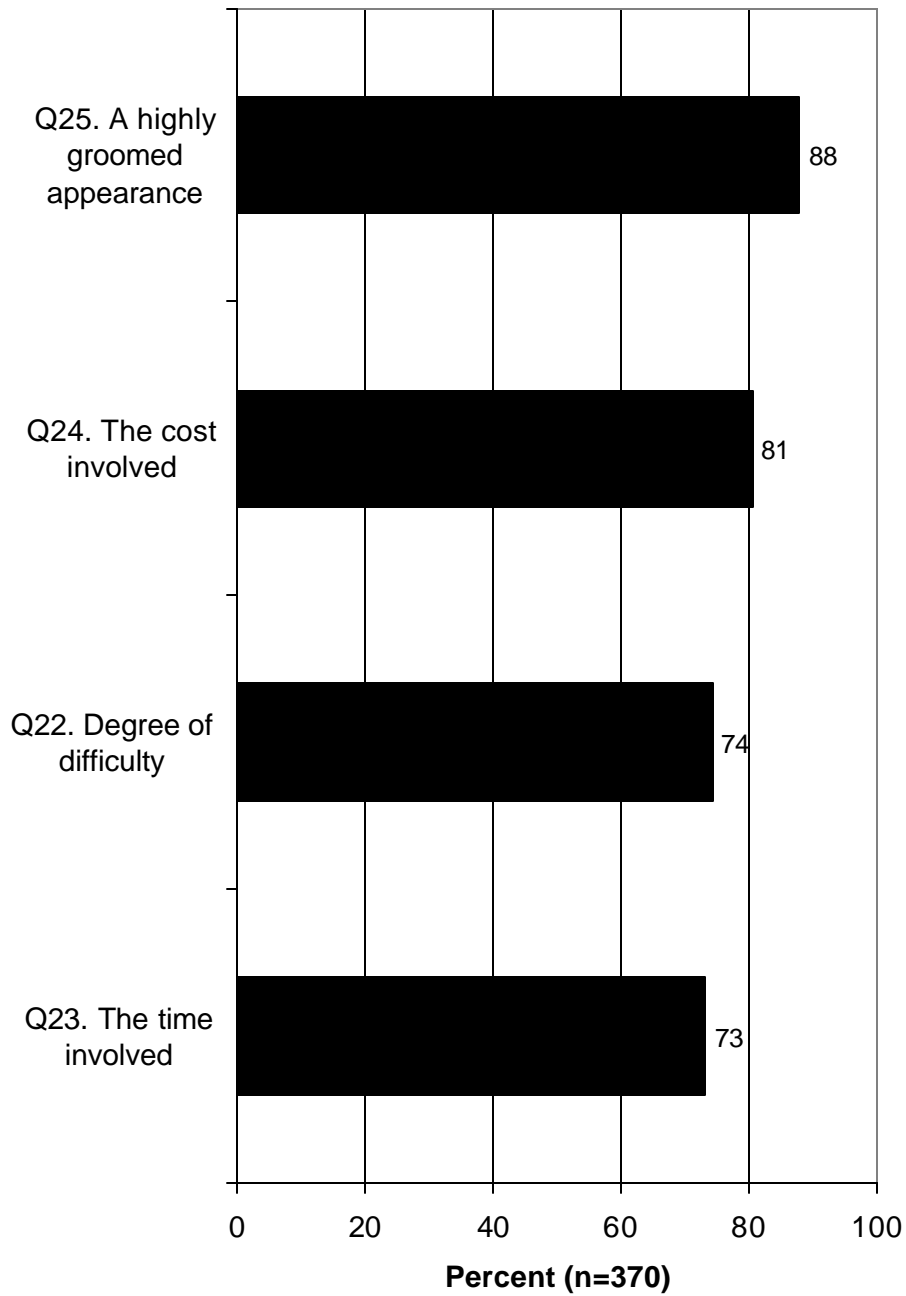
Considerations When Planning Yard Care Maintenance

- Respondents were asked about four considerations when planning their yard and associated yard-care maintenance. A highly groomed appearance had the greatest percentage answering that it was very or somewhat important (88%), followed by the cost involved (81%), then the degree of difficulty (74%) and the time involved (73%).

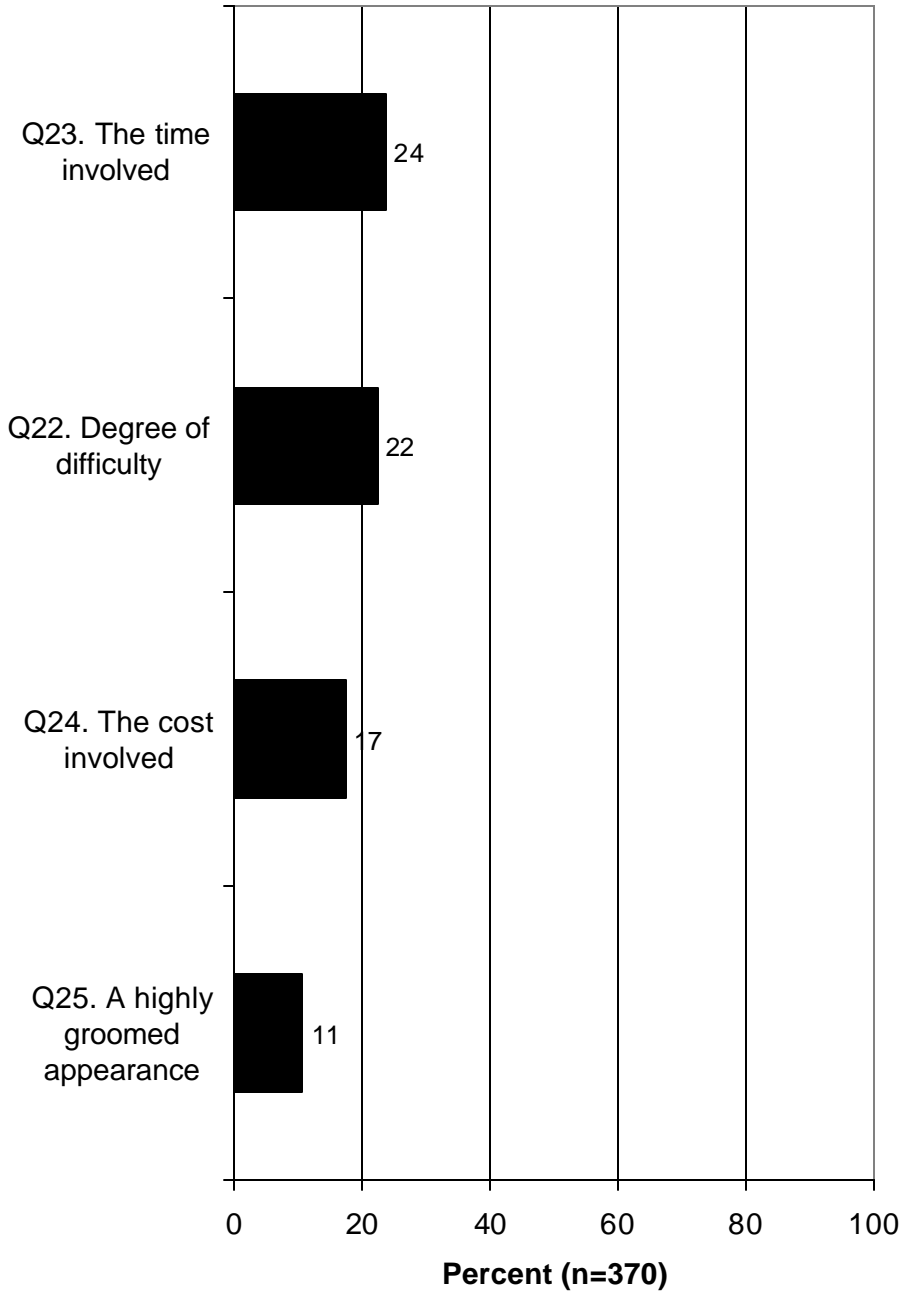
Q22-25. Percent who think the following are very important considerations when planning yard care maintenance.



Q22-25. Percent who think the following are very or somewhat important considerations when planning yard care maintenance.



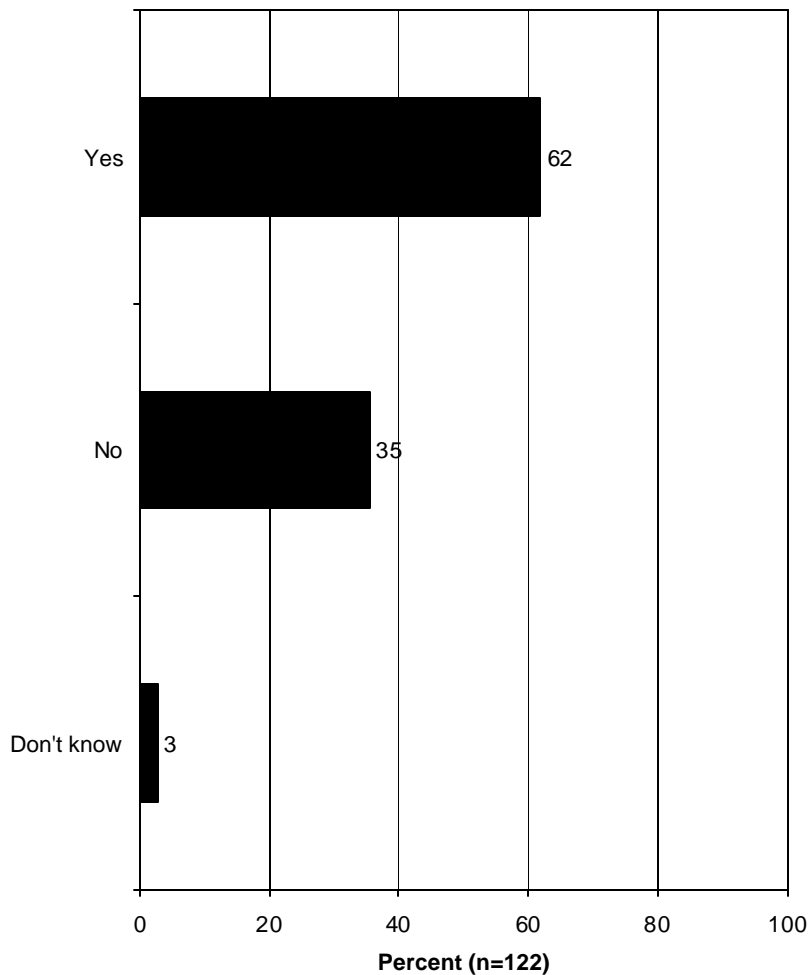
Q22-25. Percent who think the following are not important considerations at all when planning yard care maintenance.



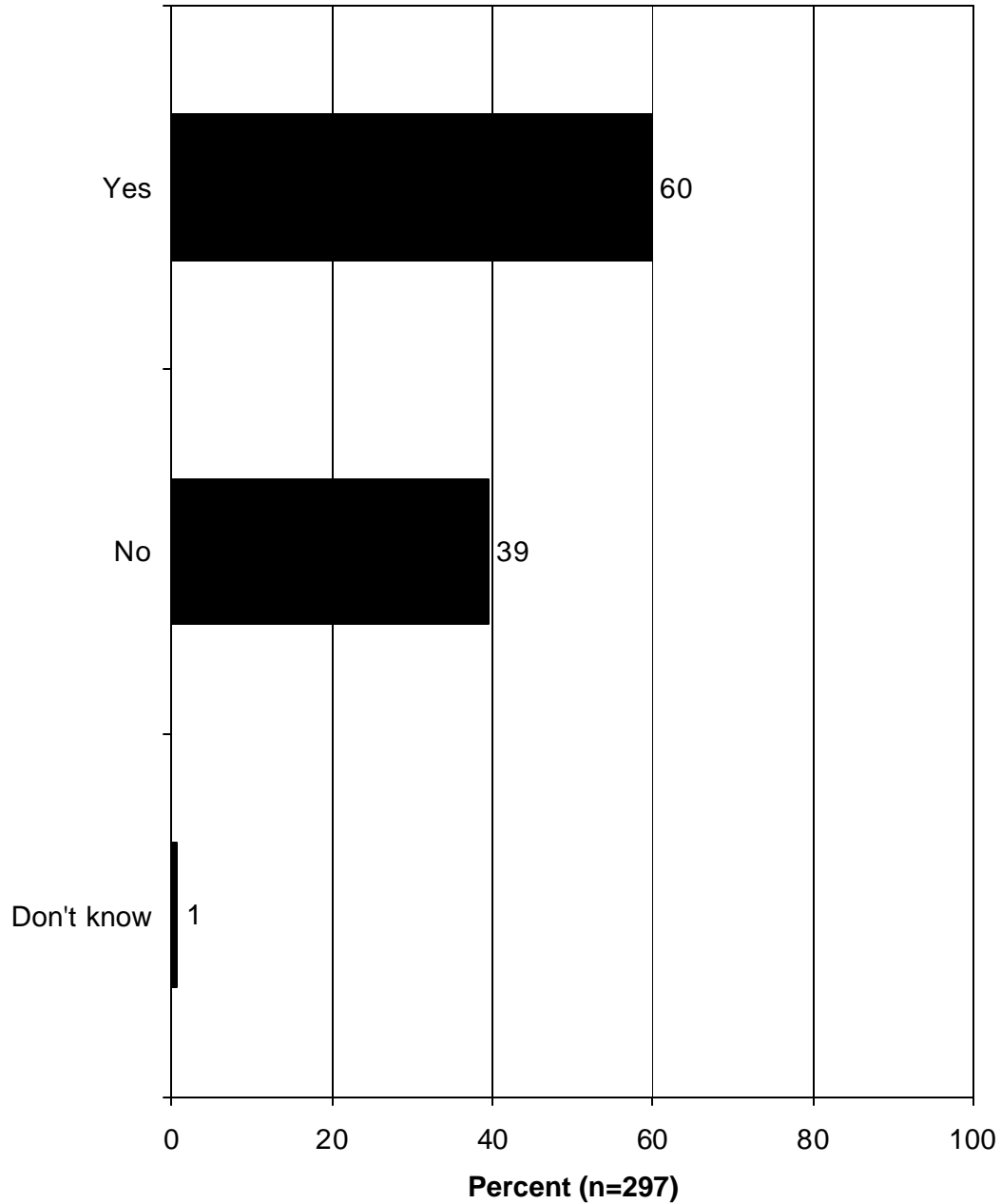
Fertilizers

- Nearly two-thirds of those who hire someone else to landscape/maintain their yard at least some of the time (62%) have the hired landscapers apply fertilizers and/or pesticides to the yard, and nearly an equal percentage of those who take care of their own lawn at least some of the time (60%) apply fertilizer to their lawn. The mean of the number of times that those who work on their own yard at least some of the time apply fertilizer is 2.24 times per year. Most commonly, those who apply fertilizer to their lawn do so in the spring or fall.

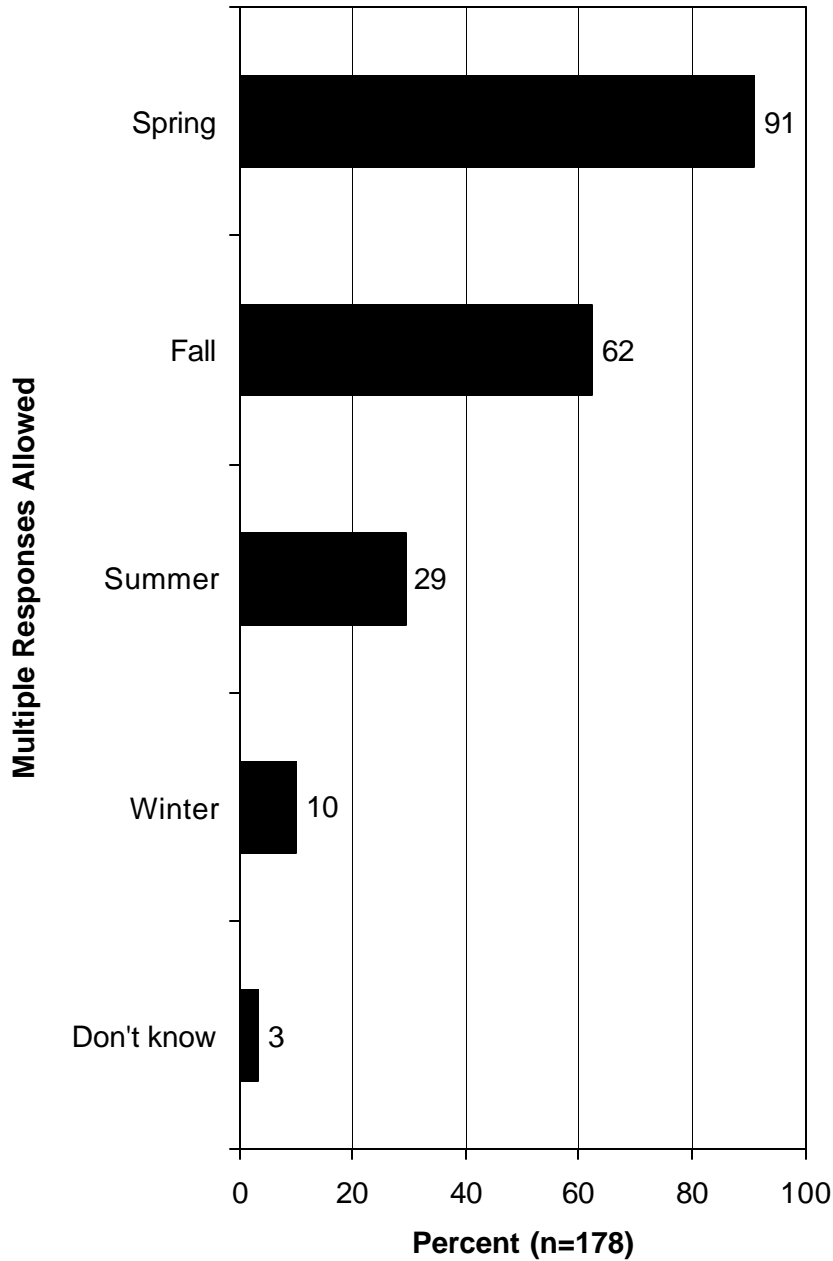
Q30. Do you have the people you hire apply fertilizers or pesticides? (Asked of those who have a yard and who hire someone to take care of it at least some of the time.)



Q31. Do you apply fertilizer to your lawn? (Asked of those who have a yard and who take care of their own yard at least some of the time.)



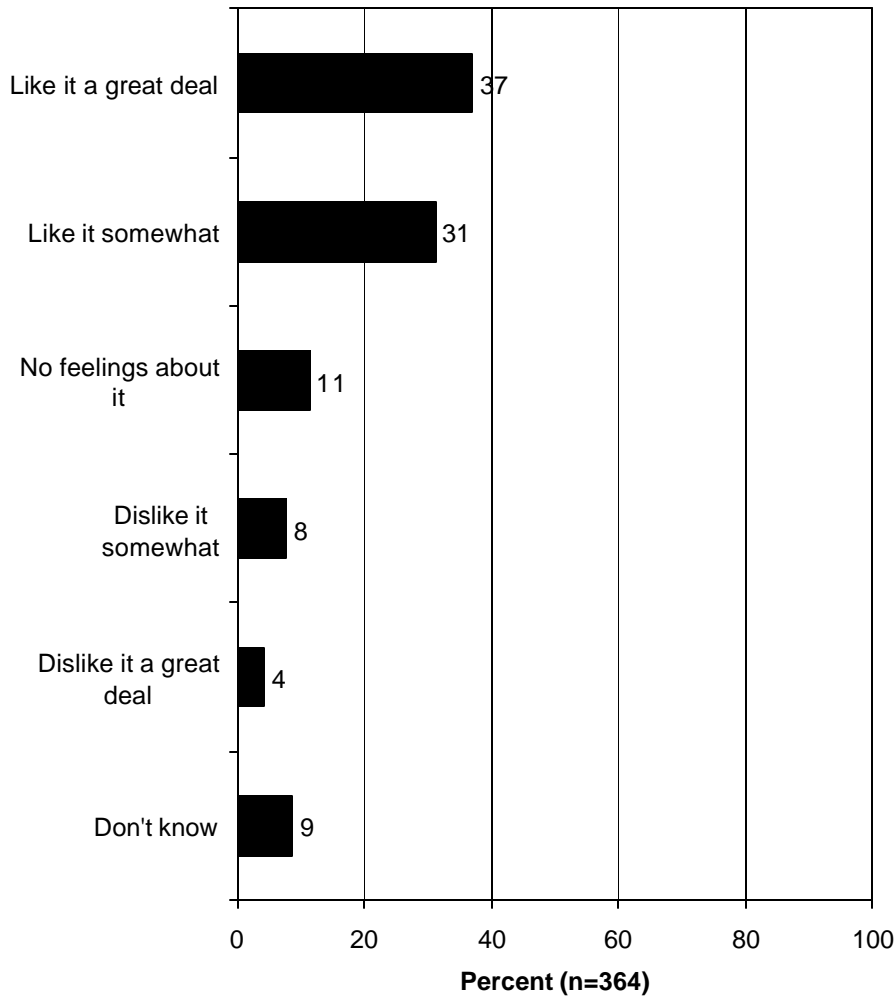
Q34. In what seasons do you apply fertilizer to your lawn? (Asked of those who have a yard, who take care of their own yard at least some of the time, and who apply fertilizer while caring for it.)



Borders and Plantings

- Those who have a yard that includes flower beds, trees and shrubs, and/or a food garden spend an average of 1.85 hours per week caring for their plantings. A large majority of these same respondents (68%) like working on their plantings a great deal or somewhat.

Q38. How much do you enjoy taking care of your plantings? Would you say you like it a great deal, like it somewhat, you have no feelings about it, you dislike it somewhat, or dislike it a great deal? (Asked of those who have a yard that includes flower beds, trees and shrubs, and/or a food garden.)



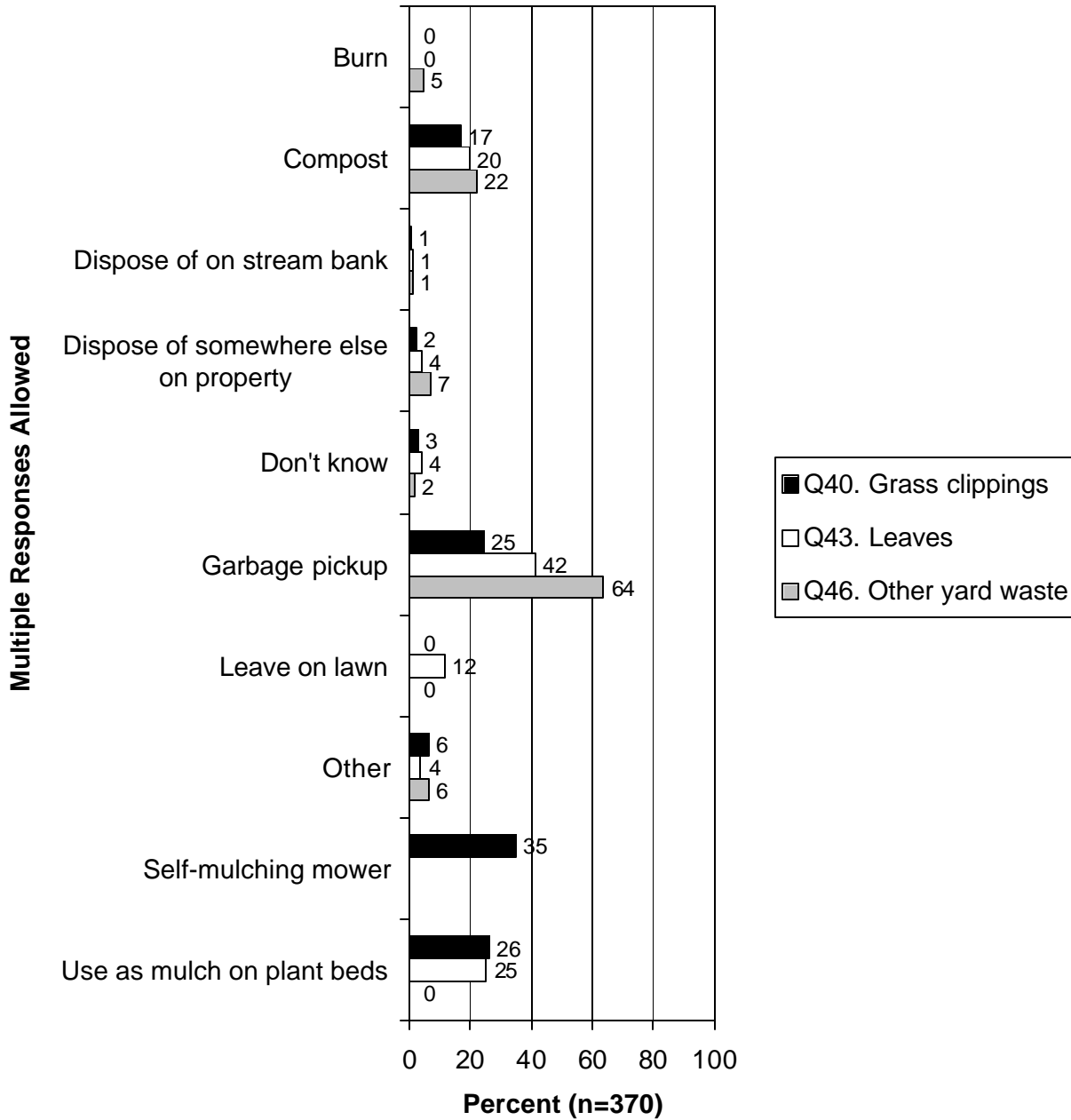
Disposal/Use of Grass Clippings and Other Yard Waste

- Just more than a third of respondents (35%) take care of grass clippings using a self-mulching mower, while 26% use grass clippings as mulch on plant beds; 25% dispose of grass clippings in the garbage pickup.

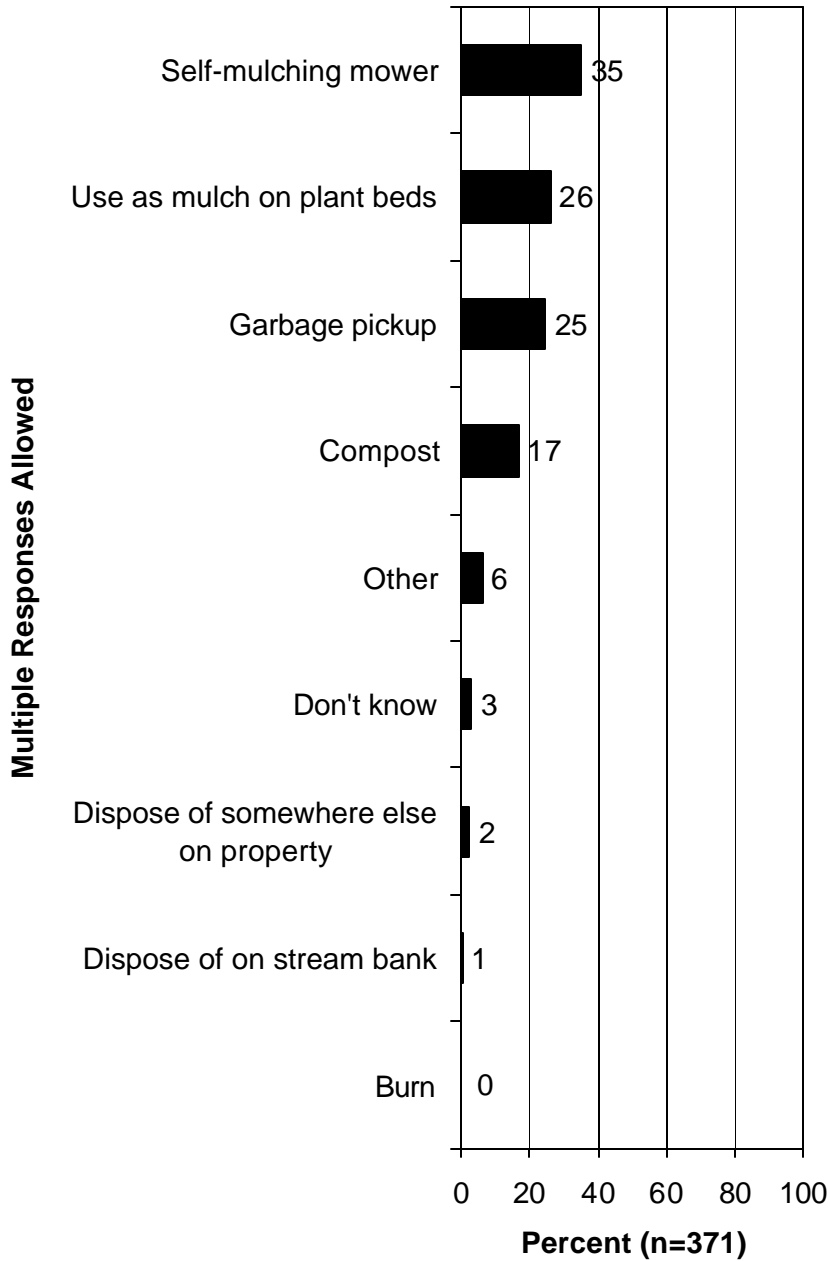
- A substantial percentage of those who have a yard (42%) put leaves out for garbage pickup, while 25% use as mulch on plant beds and 20% compost them.

- A majority of those who have a yard (64%) put other yard waste (i.e., other than grass clippings or leaves) out for garbage pickup, while 22% compost it.

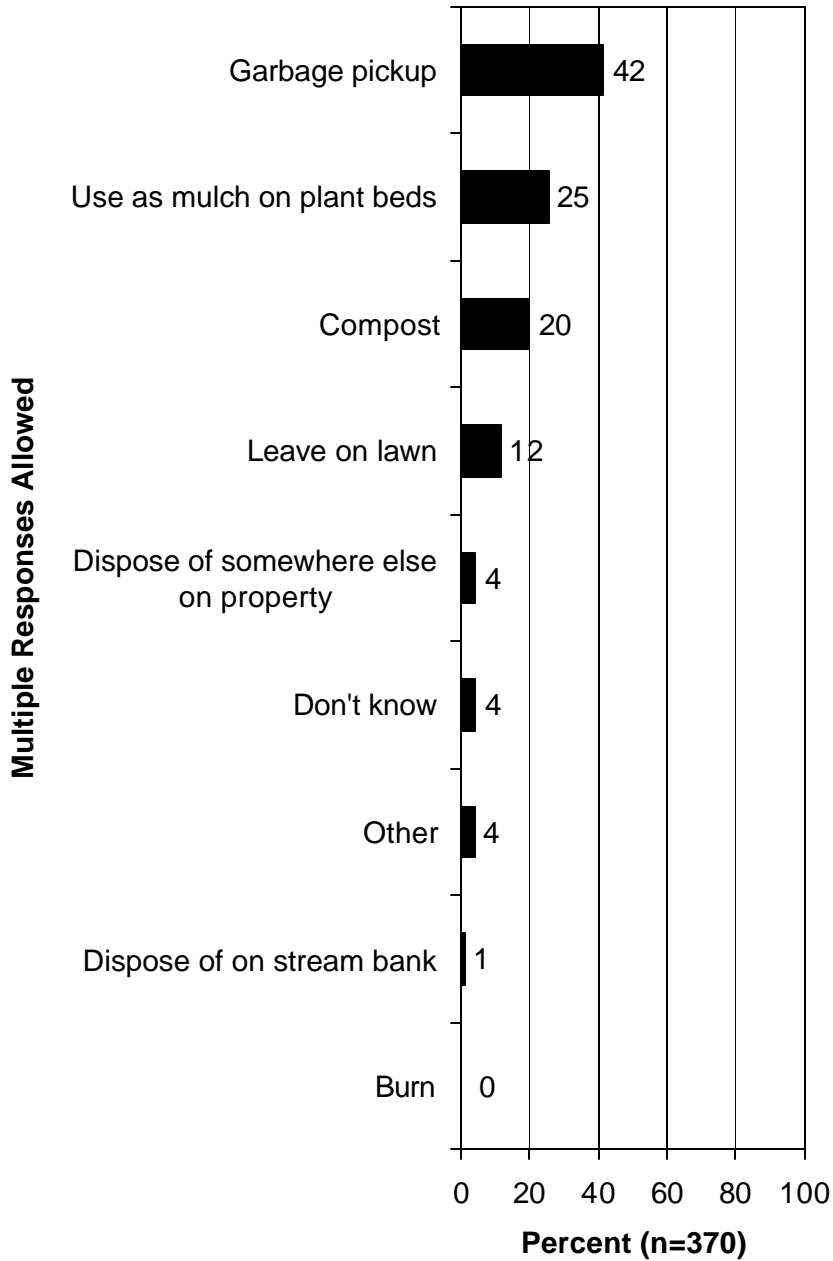
Q40, 43, and 46. For the most part, what do you do with the following? (Asked of those who have a yard.)



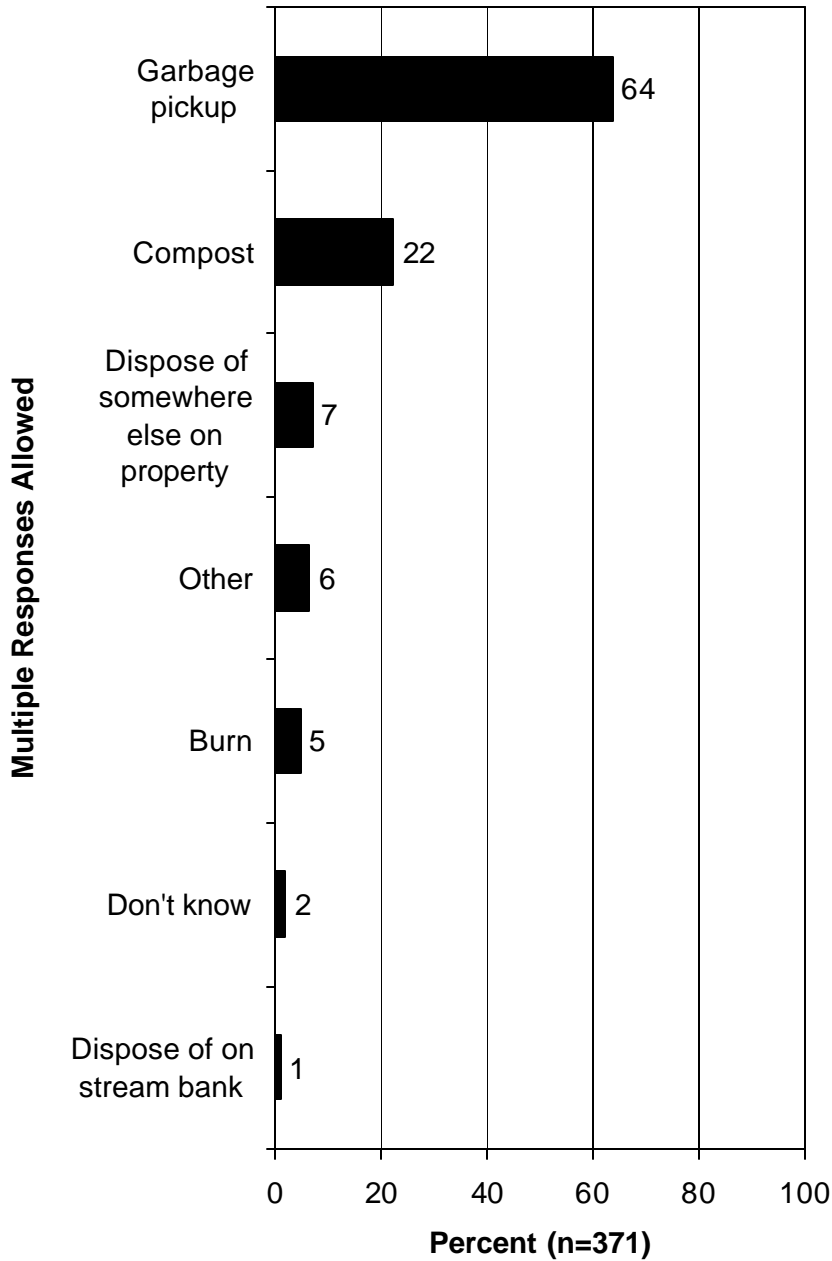
Q40. For the most part, what do you do with grass clippings? (Asked of those who have a yard.)



Q43. For the most part, what do you do with leaves? (Asked of those who have a yard.)



**Q46. For the most part, what do you do with other yard waste (e.g., plant, shrub, and tree clippings)?
(Asked of those who have a yard.)**



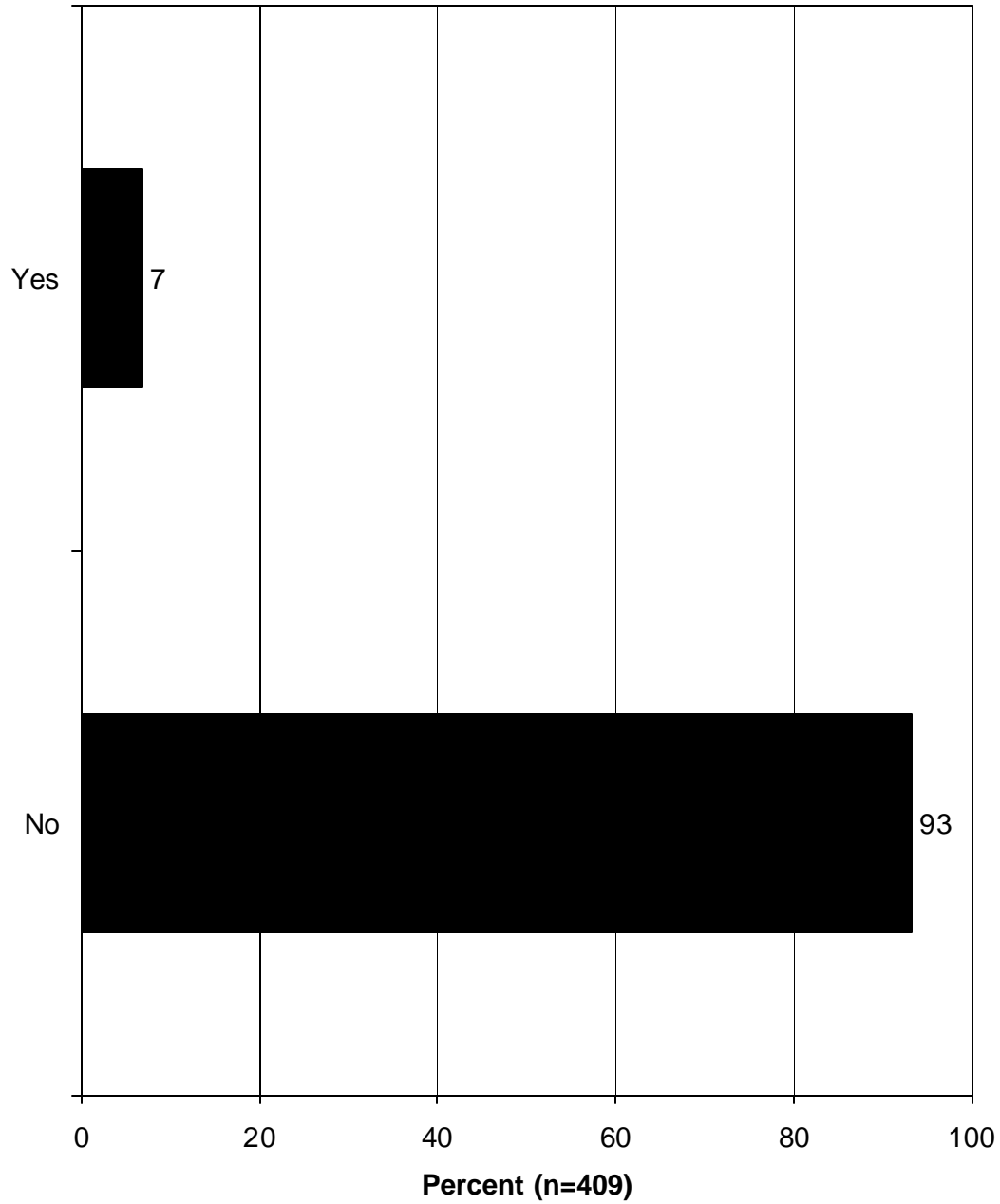
USE OF STREAM BANKS AND THE EFFECTS ON WATER QUALITY

- Most respondents did not have a stream on their property, although 7% did. Most of those who have a stream on their property leave the stream bank in a natural state, but 24% maintain the stream bank. When asked to characterize the stream bank on their property, 8% said it is mowed grass, 5% said it is a planted border without trees, and 8% said it is a planted border with trees (the overwhelming majority [78%] said the stream bank is left in a natural state).

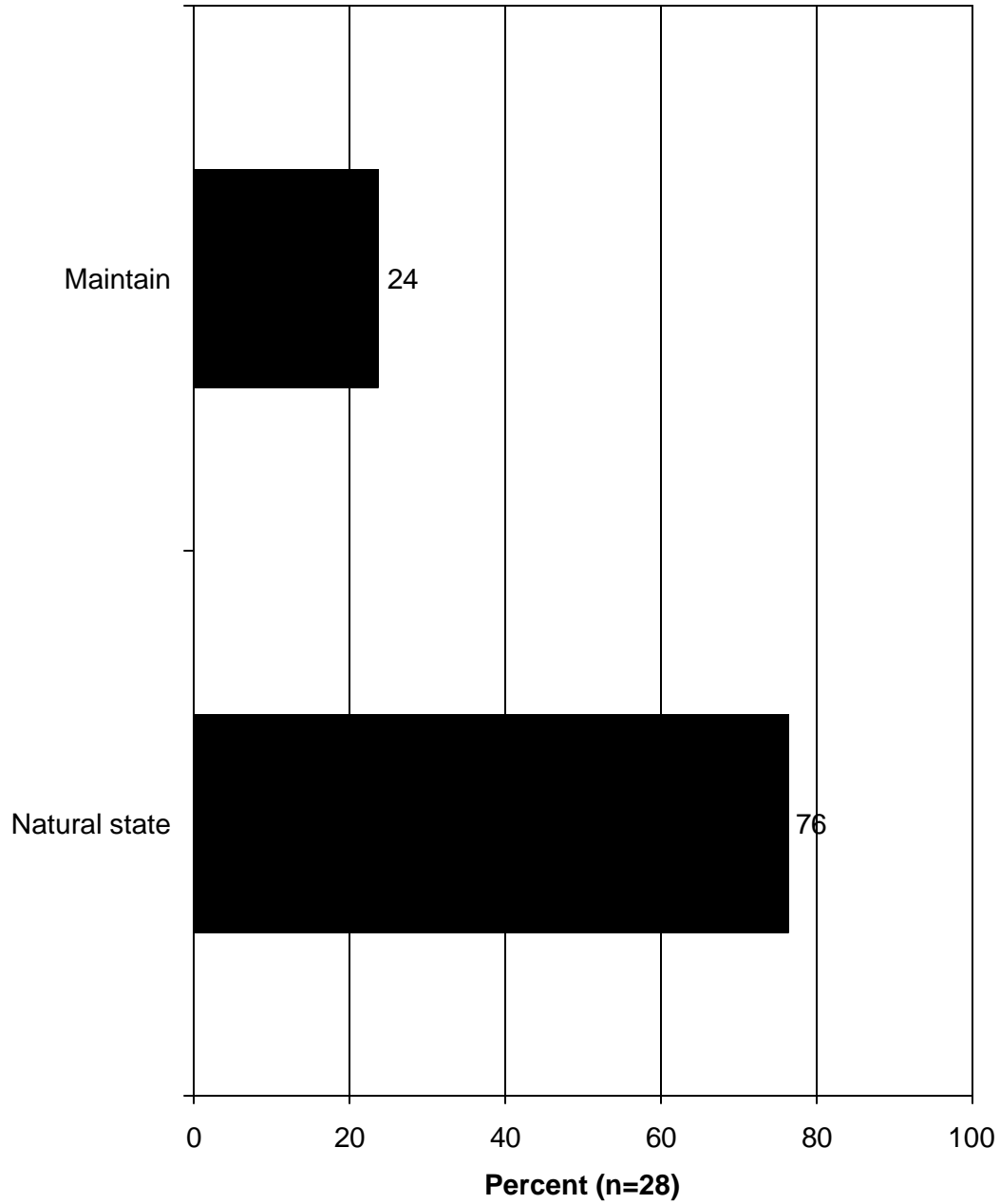
- Respondents were asked about seven possible hindrances to their planting a border along the stream on their property. The top answers of major hindrances were that a border would block the view of the stream (20%), the cost involved (19%), or having to rake leaves (15%). Not knowing how to choose plants or not knowing where to get plants were the top items deemed not to be a hindrance.

- Regarding other reasons not to plant a border, a substantial percentage (17%) said they don't like the way a border looks.

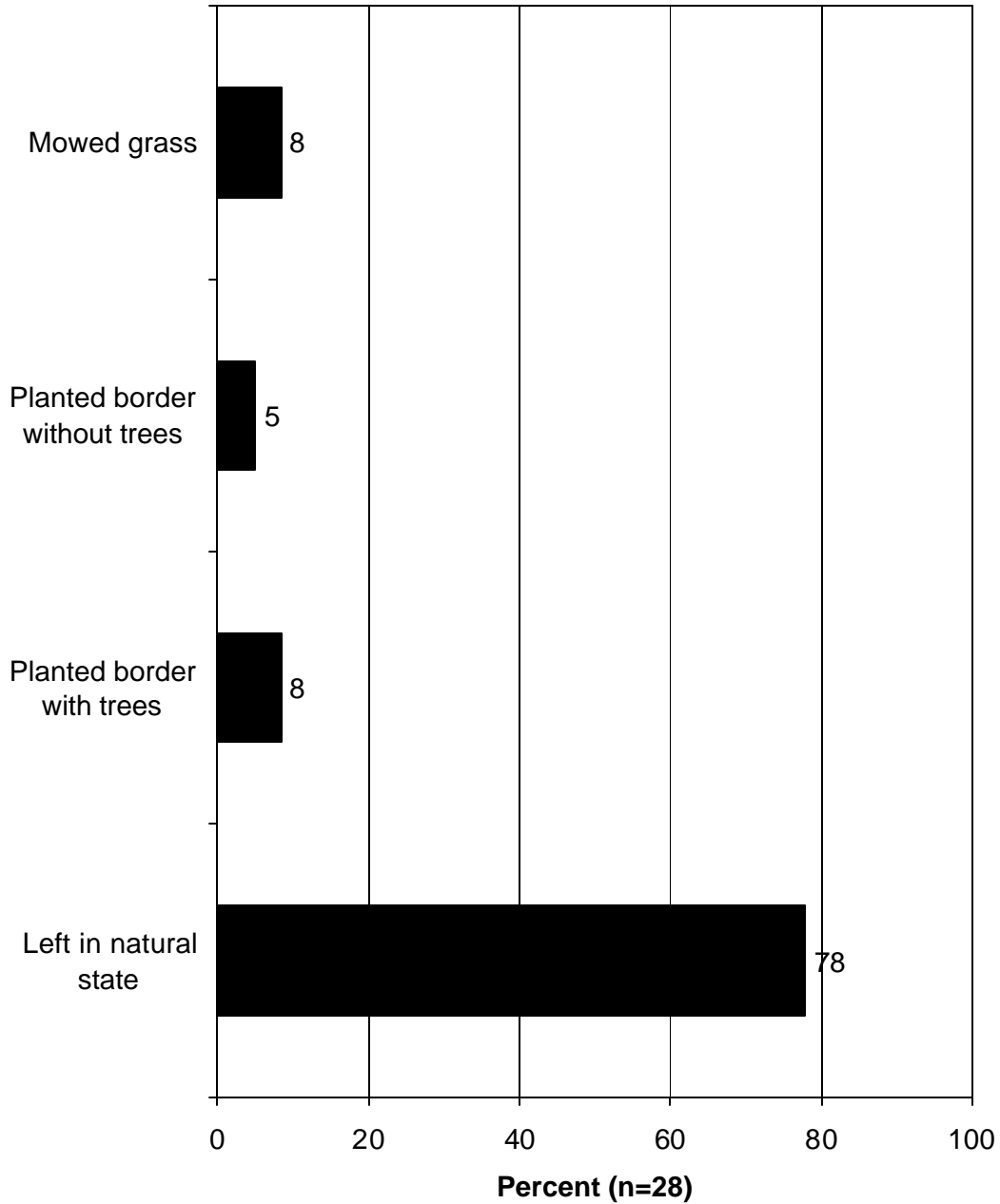
Q52. Do you have a stream on your property?



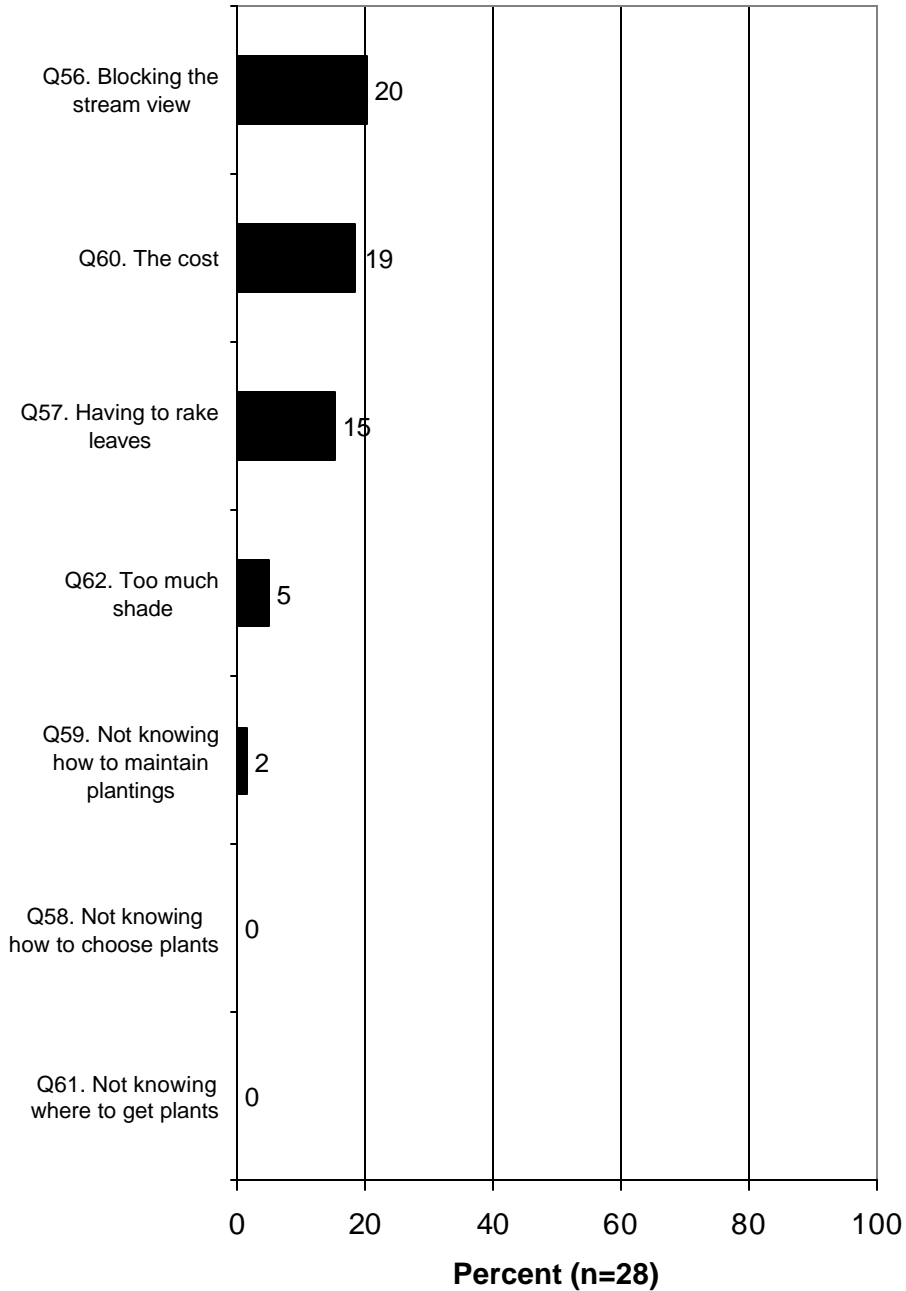
Q53. Do you maintain your stream bank or do you leave it in its natural state? (Asked of those who have a stream on their property.)



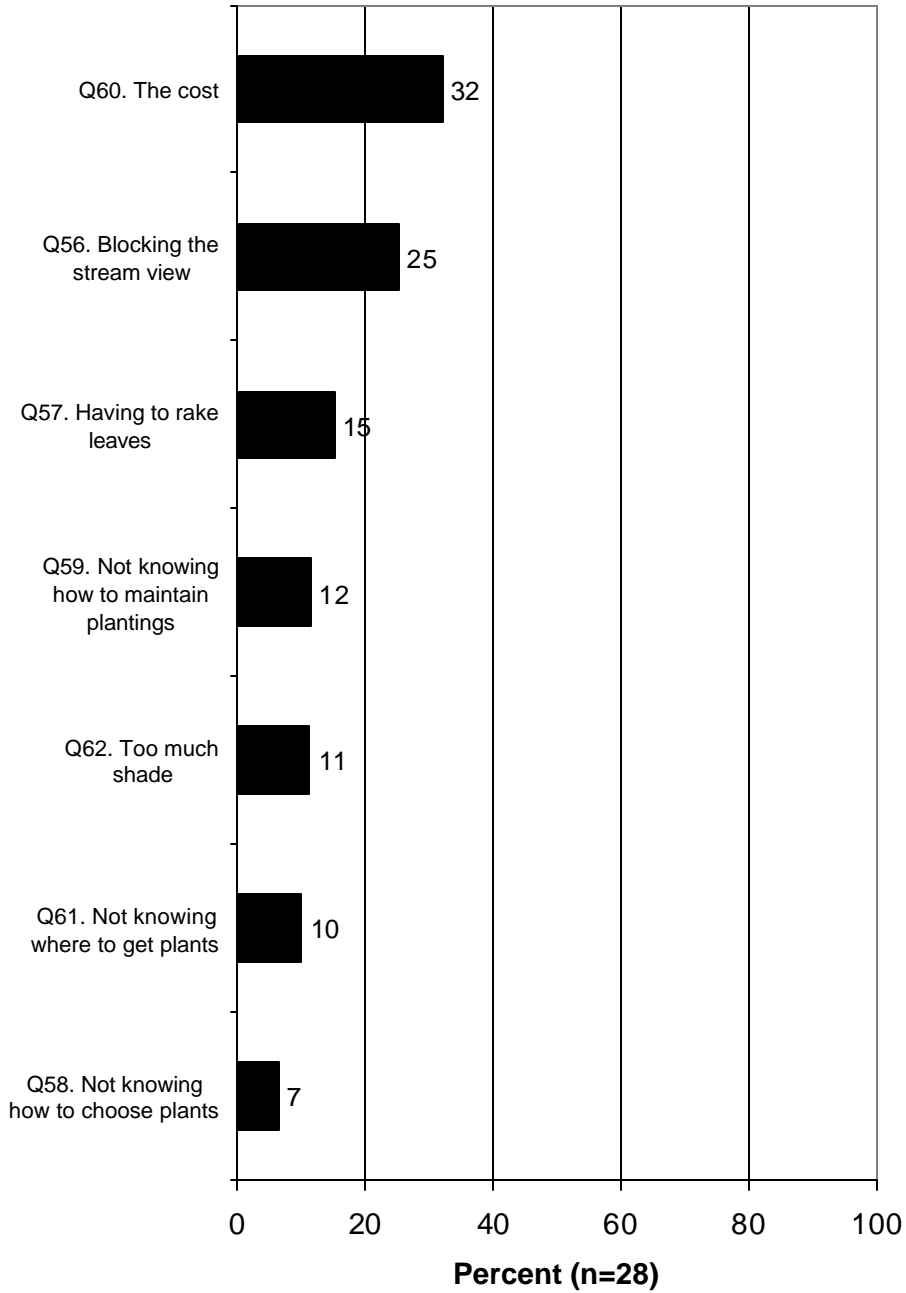
Q54. Which of the following descriptions best fits your stream bank? (Asked of those who have a stream on their property.)



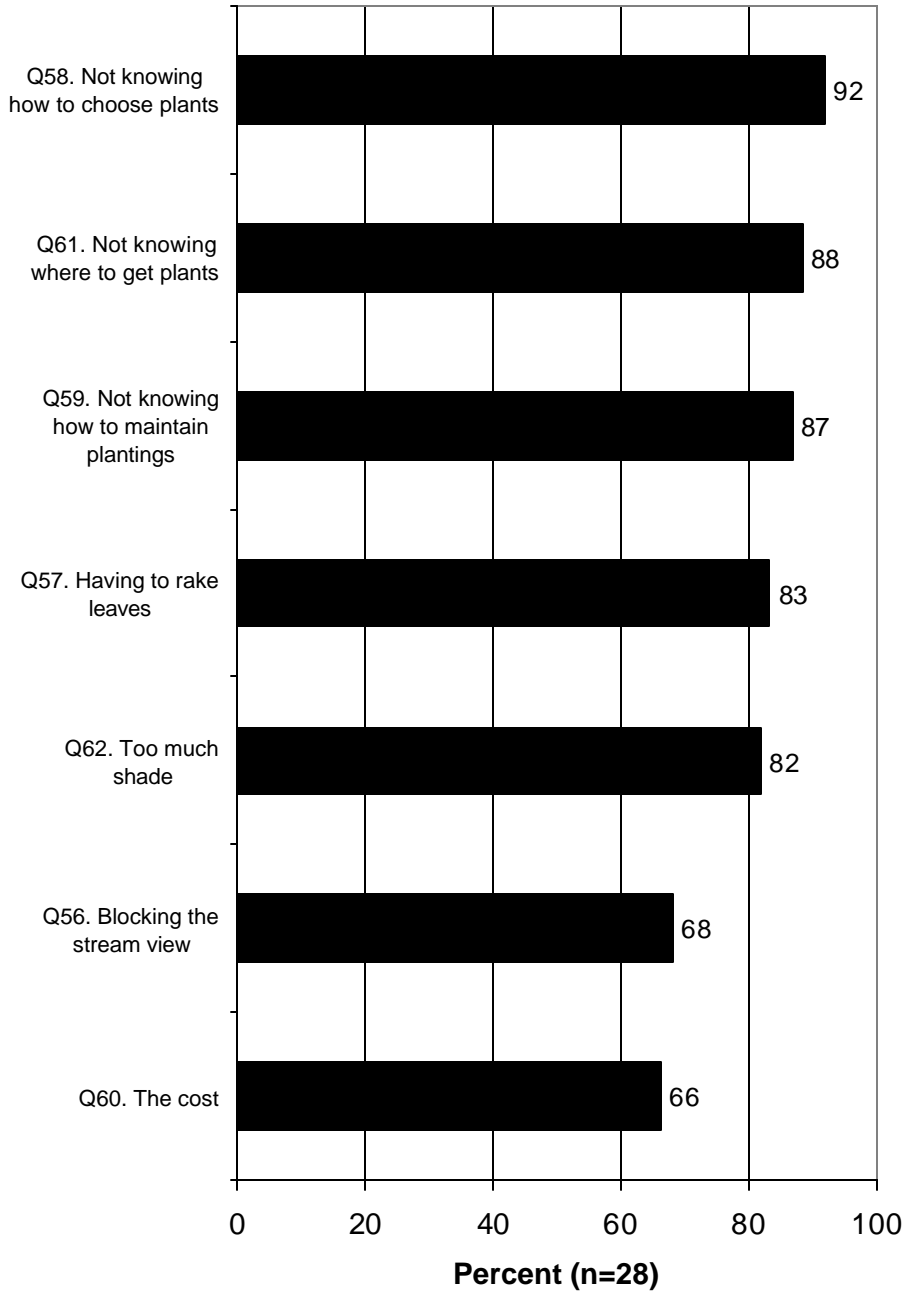
Q56-62. Percent who think the following are a major hindrance to planting borders along stream banks.



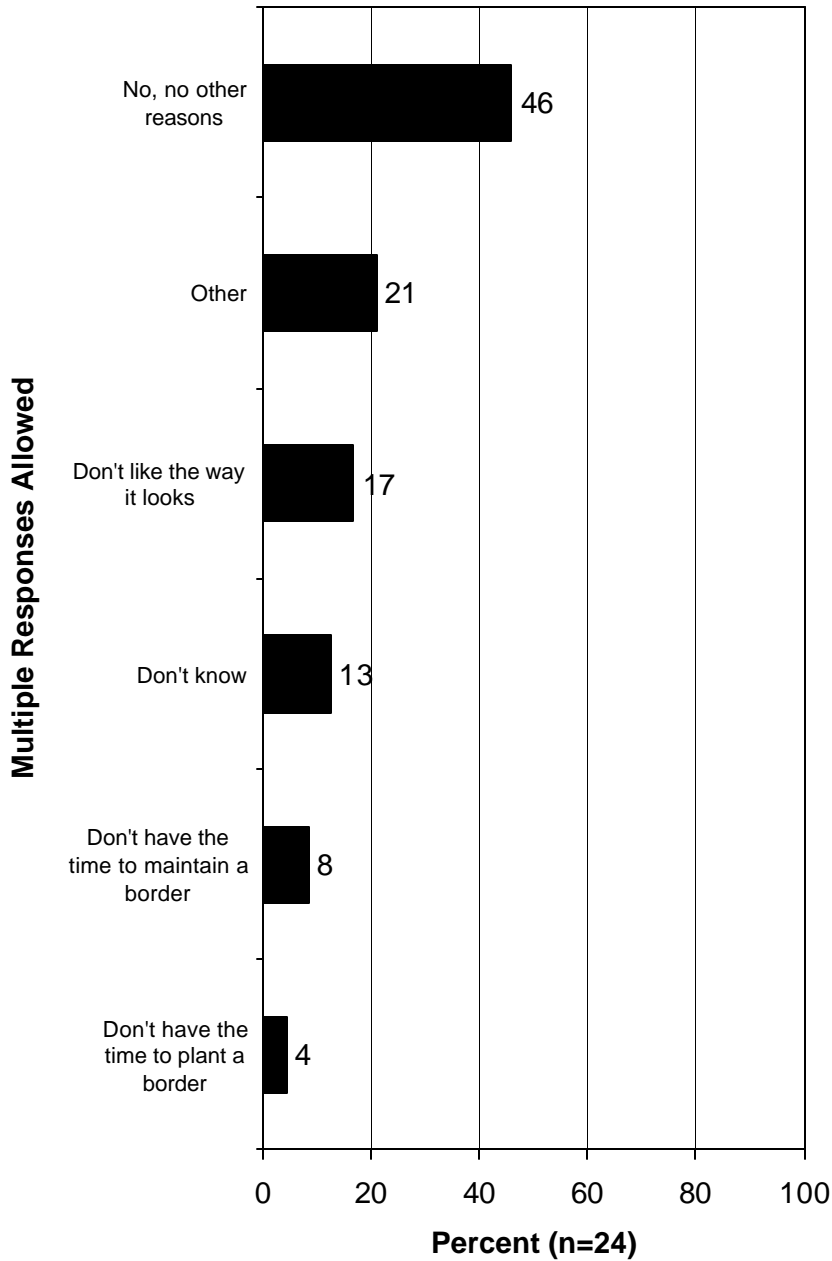
Q56-62. Percent who think the following are a major or minor hindrance to planting borders along stream banks.



Q56-62. Percent who think the following are not a hindrance to planting borders along stream banks.



Q64. Are there other reasons why you would not consider planting a border? (Asked of those who have a stream on their property that is not currently planted in a border.)

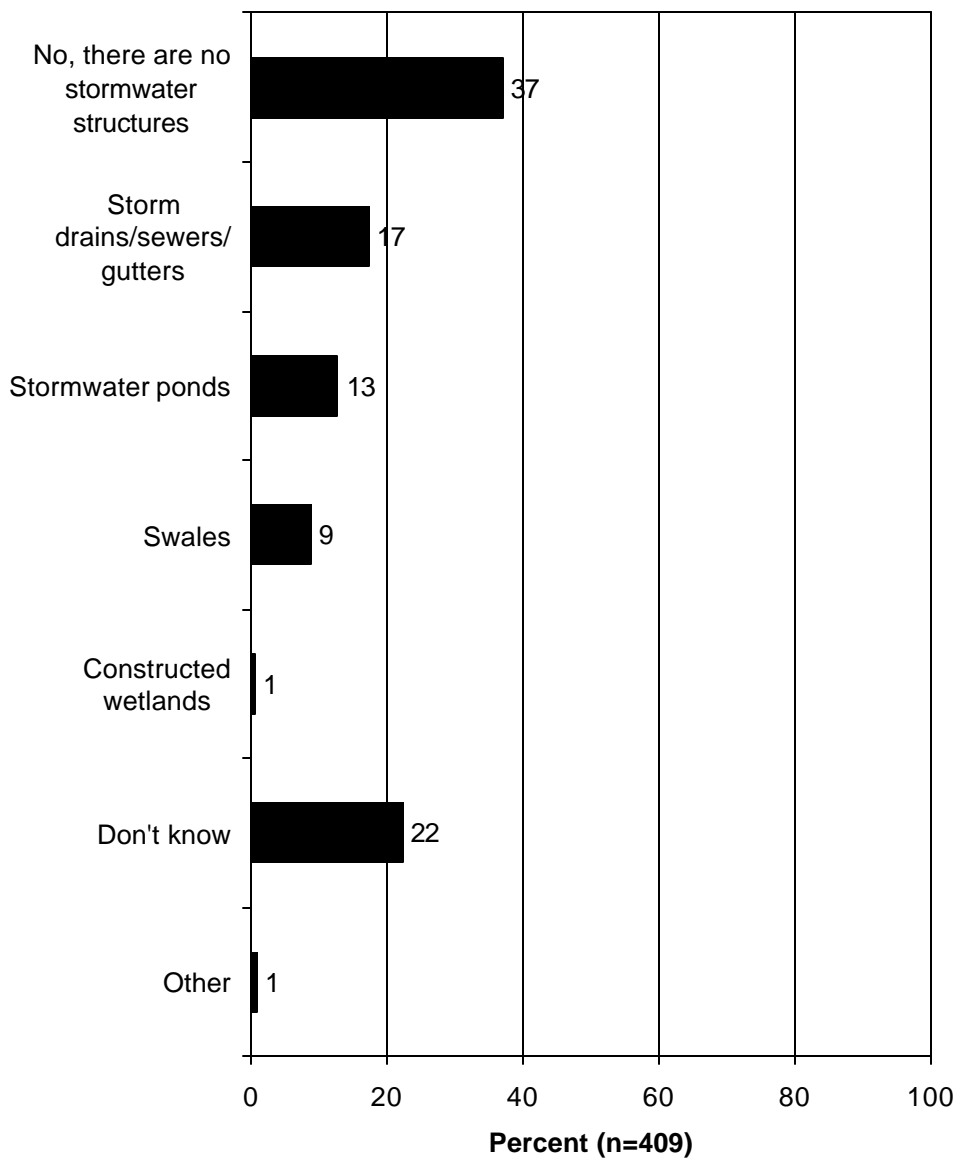


MANAGEMENT OF STORMWATER RUNOFF

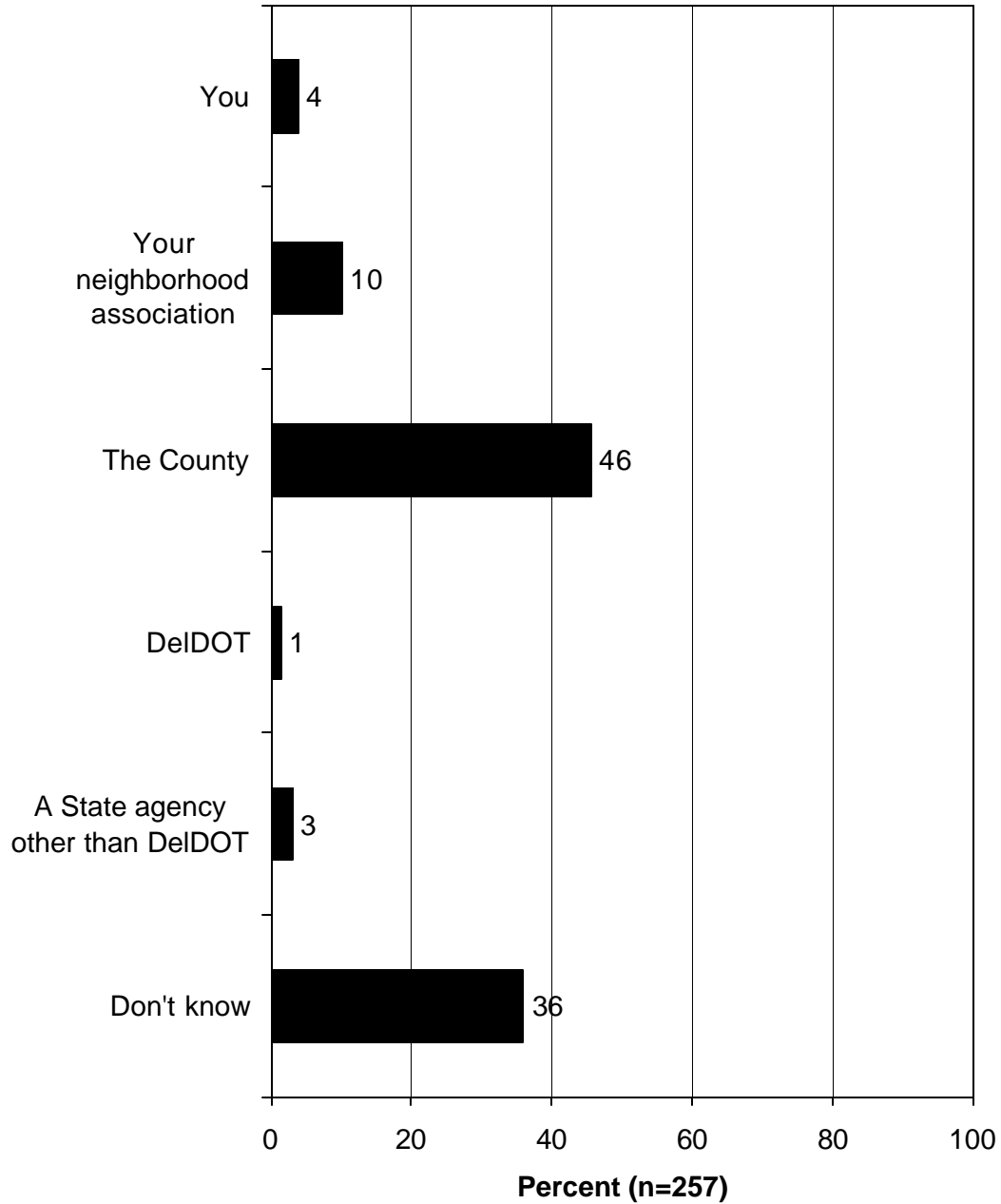
- While 37% of respondents said that their neighborhood contains no stormwater structures and 22% did not know, 17% identified storm drains/sewers/gutters, 13% identified stormwater ponds, and 9% identified swales.
- Of those who indicated that their neighborhood contains a stormwater structure, nearly half (46%) said that their county maintains them. “Don’t know” was the next most common answer (36%).
- Respondents most commonly thought that stormwater flows directly into local streams (48%), followed by those who thought stormwater runoff is collected and sent to the wastewater treatment plant (21%).
- Respondents were asked about whether they support eight items or actions relating to water quality. A majority strongly or moderately supported each item or action. The items/actions that topped the list were constructed wetlands (73% strongly or moderately supported), limiting paved areas (65%), stormwater ponds/basins (63%), and rain gardens (62%).
- Respondents were asked about four possible actions that they could take that would help protect water quality. None of the actions had a majority saying that they would be very or somewhat likely to do the action. The top actions were adopt a storm drain (42% would be very or somewhat likely to do this) and install a rain barrel to catch roof runoff (42%), followed closely by wash their car at a carwash instead of at their property (41%). Sweep the curb was the last action (38%). However, in looking at those actions that respondents would be somewhat or very unlikely to do, sweep the curb is the last (only 10% said that they would be very or somewhat unlikely to the action), while installing a rain barrel to capture roof runoff was the top action that respondents would be unlikely to do (42% said that they would be very or somewhat unlikely to do this). Finally, the action that respondents most commonly already do is adopting a storm drain (10% do this) and installing a rain barrel to catch roof runoff (also 10%).

- Roughly two-thirds of respondents (67%) said that they would be willing to pay \$2 per month to pay for necessary improvements to stormwater runoff facilities to protect water quality; 19% would not be willing.

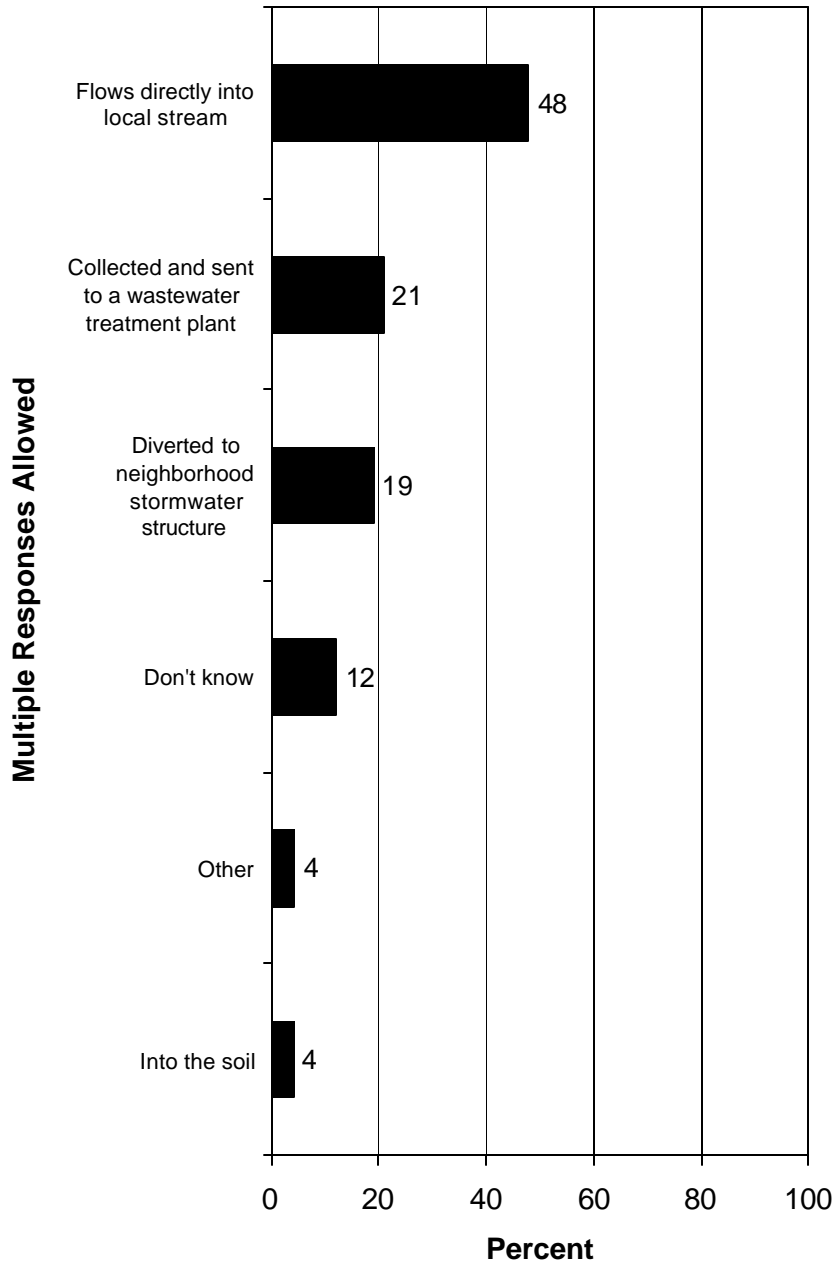
Q66. Does your neighborhood contain stormwater structures? If yes, what type?



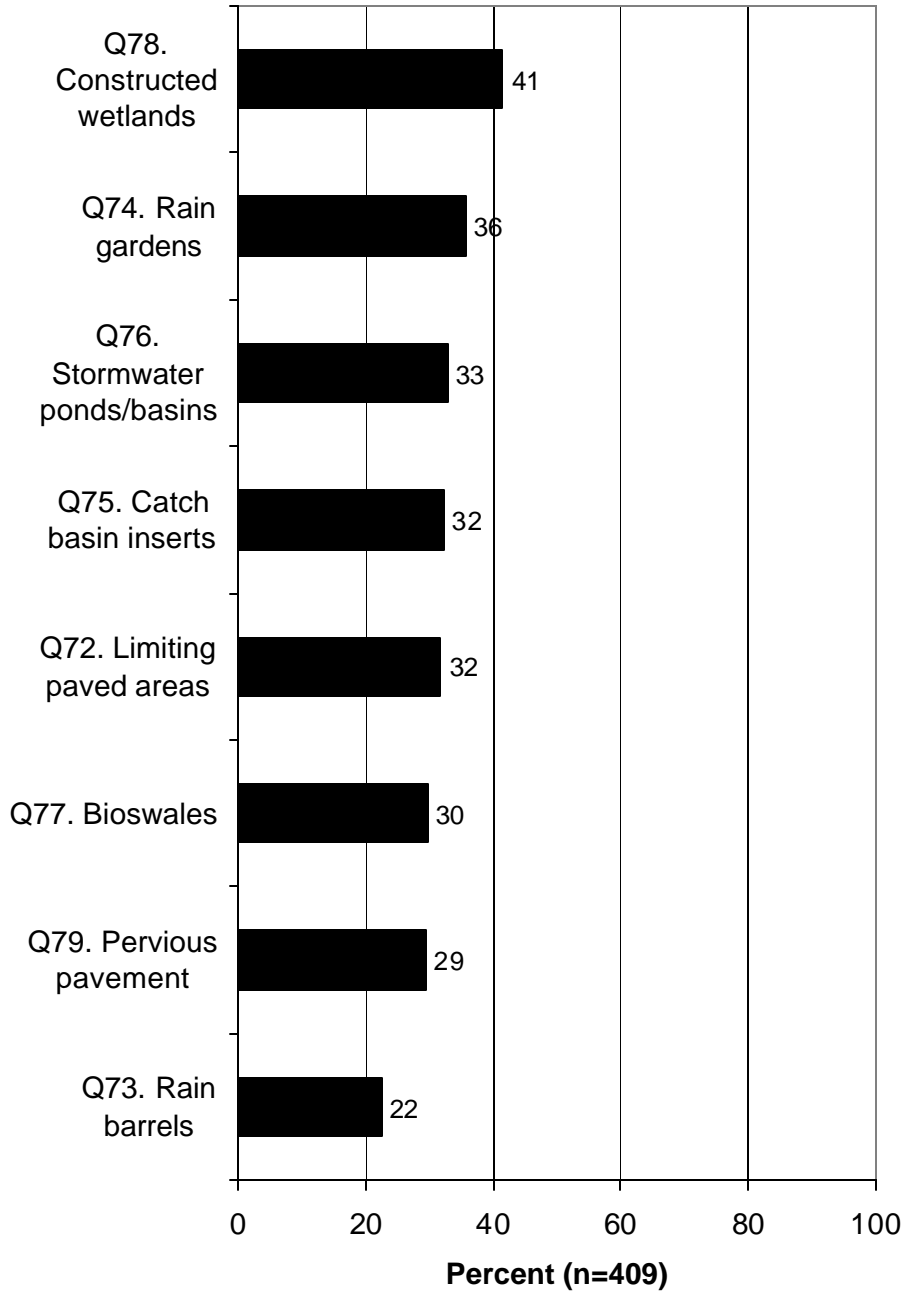
**Q68. Who maintains these stormwater structures?
(Asked of those whose neighborhood contains a
stormwater structure.)**



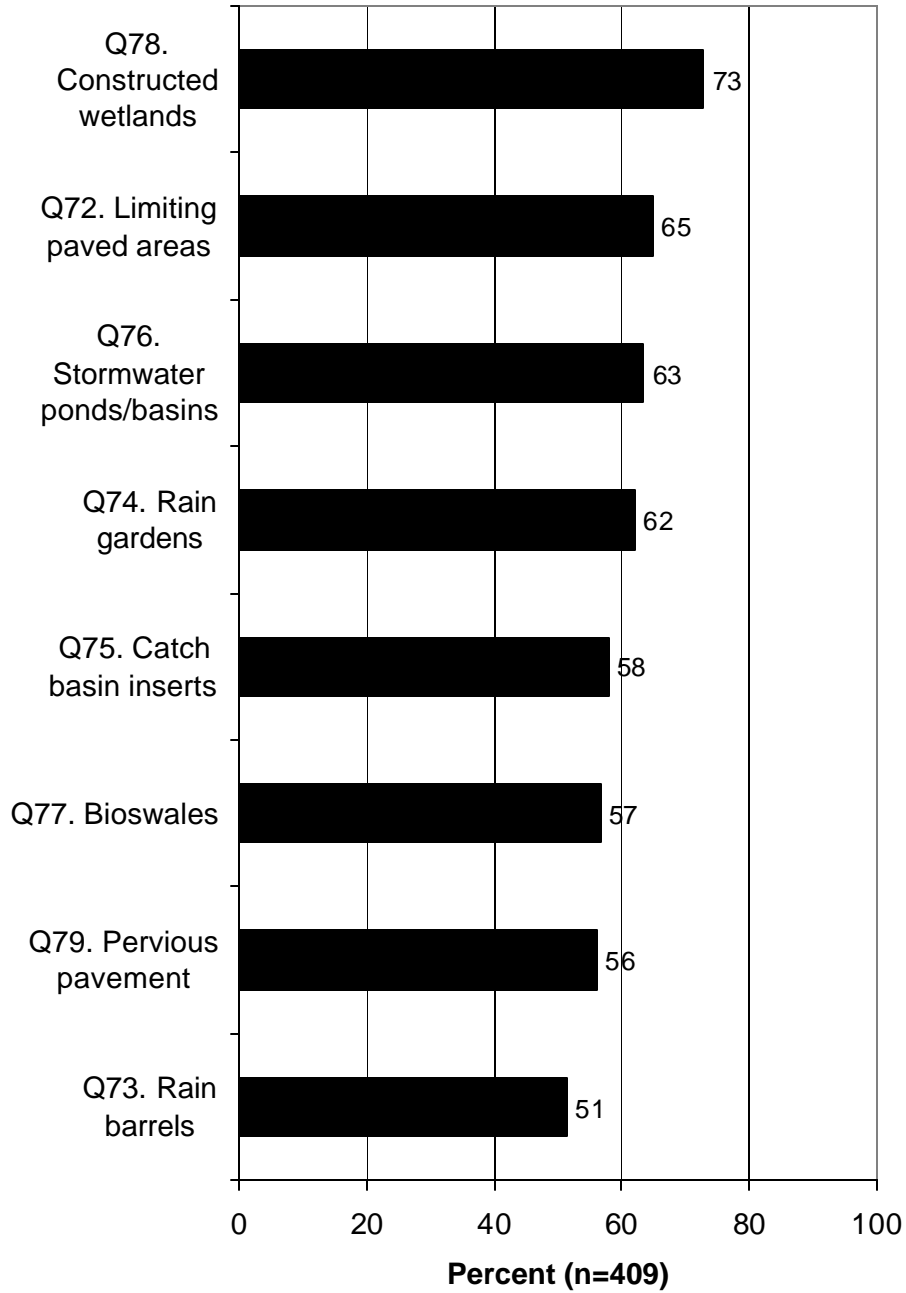
Q70. When it rains hard and water is flowing from your property and from streets in the neighborhood, where do you think that stormwater runoff goes?



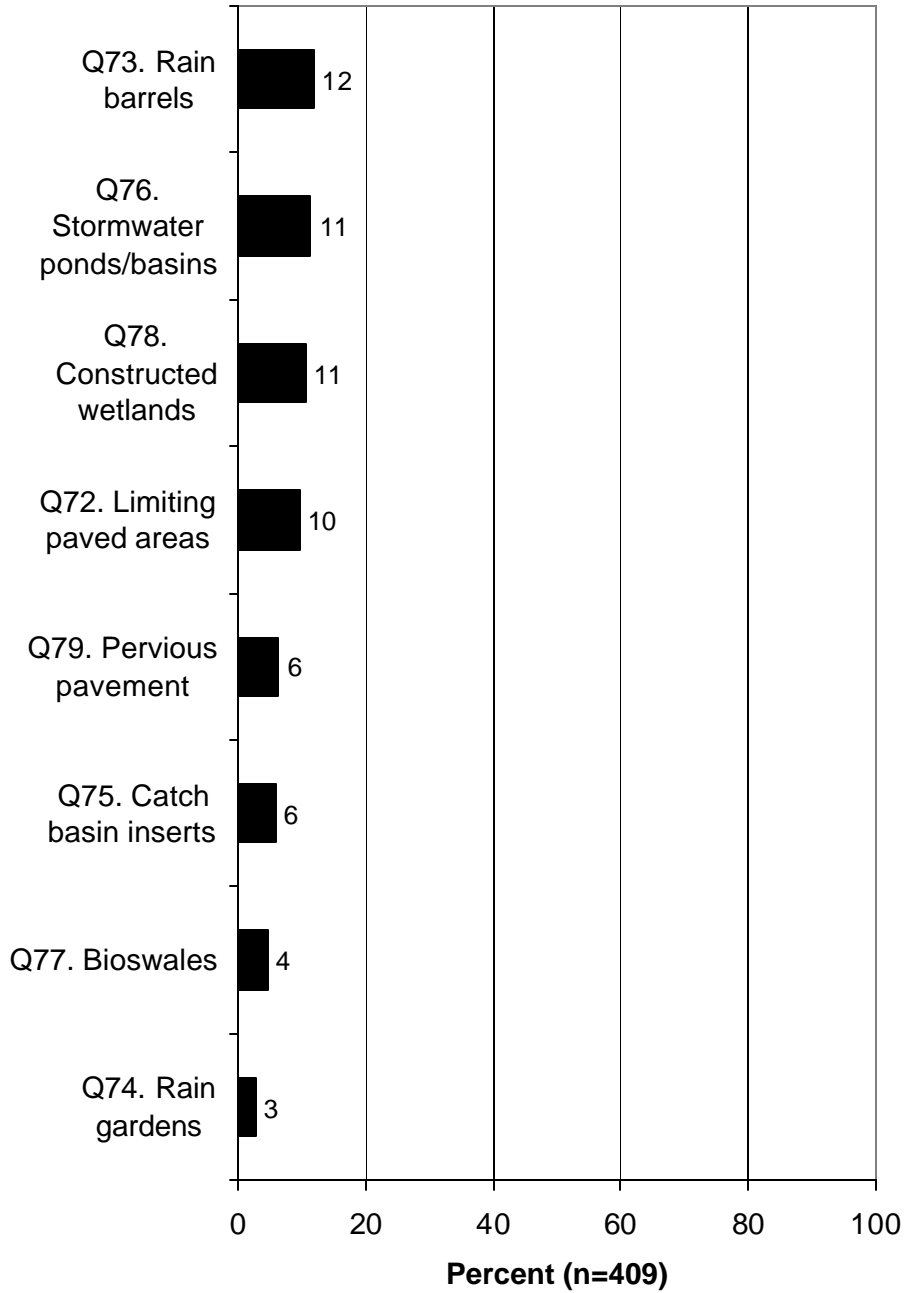
Q72-79. Percent who strongly support the following.



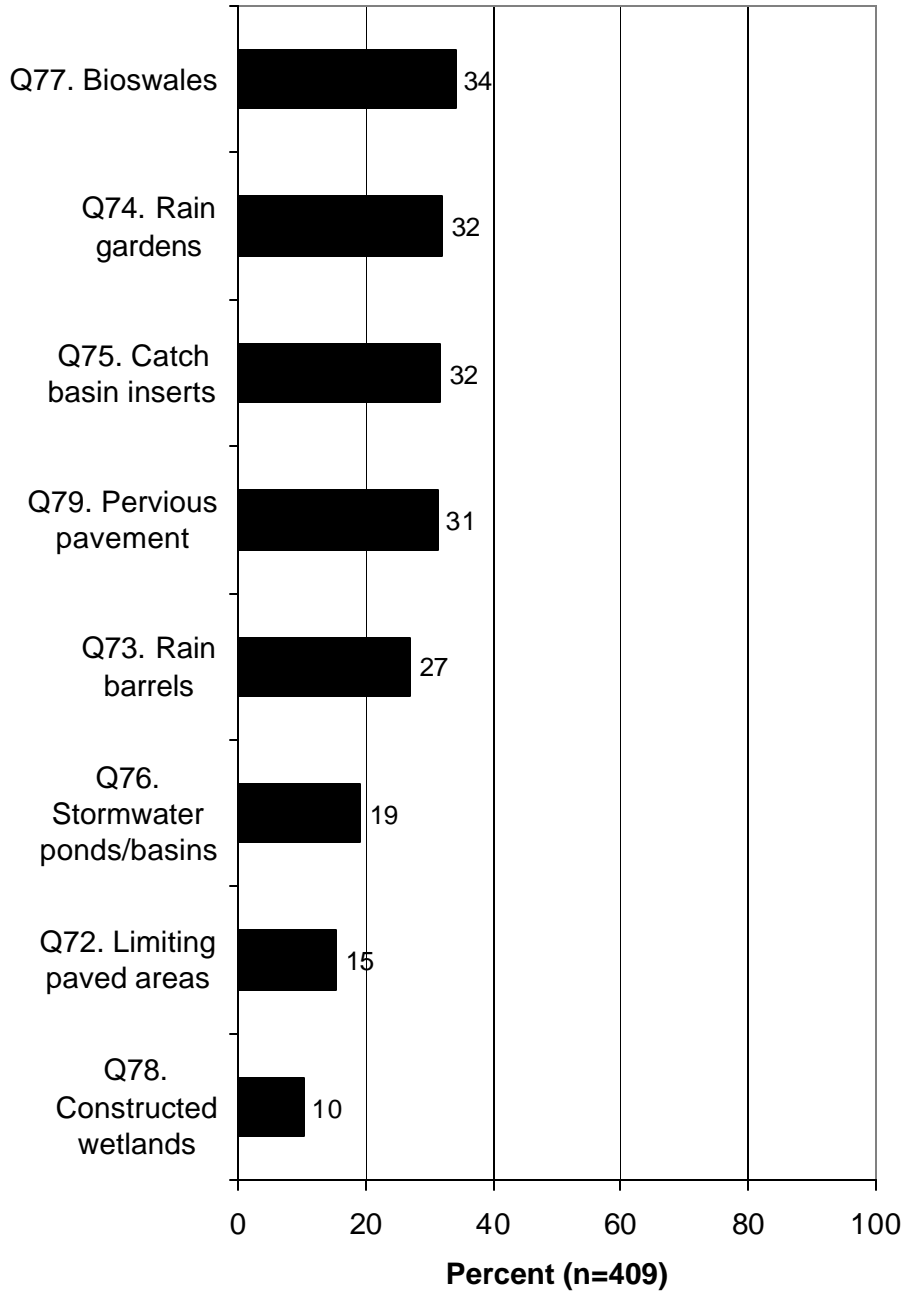
Q72-79. Percent who strongly or moderately support the following.



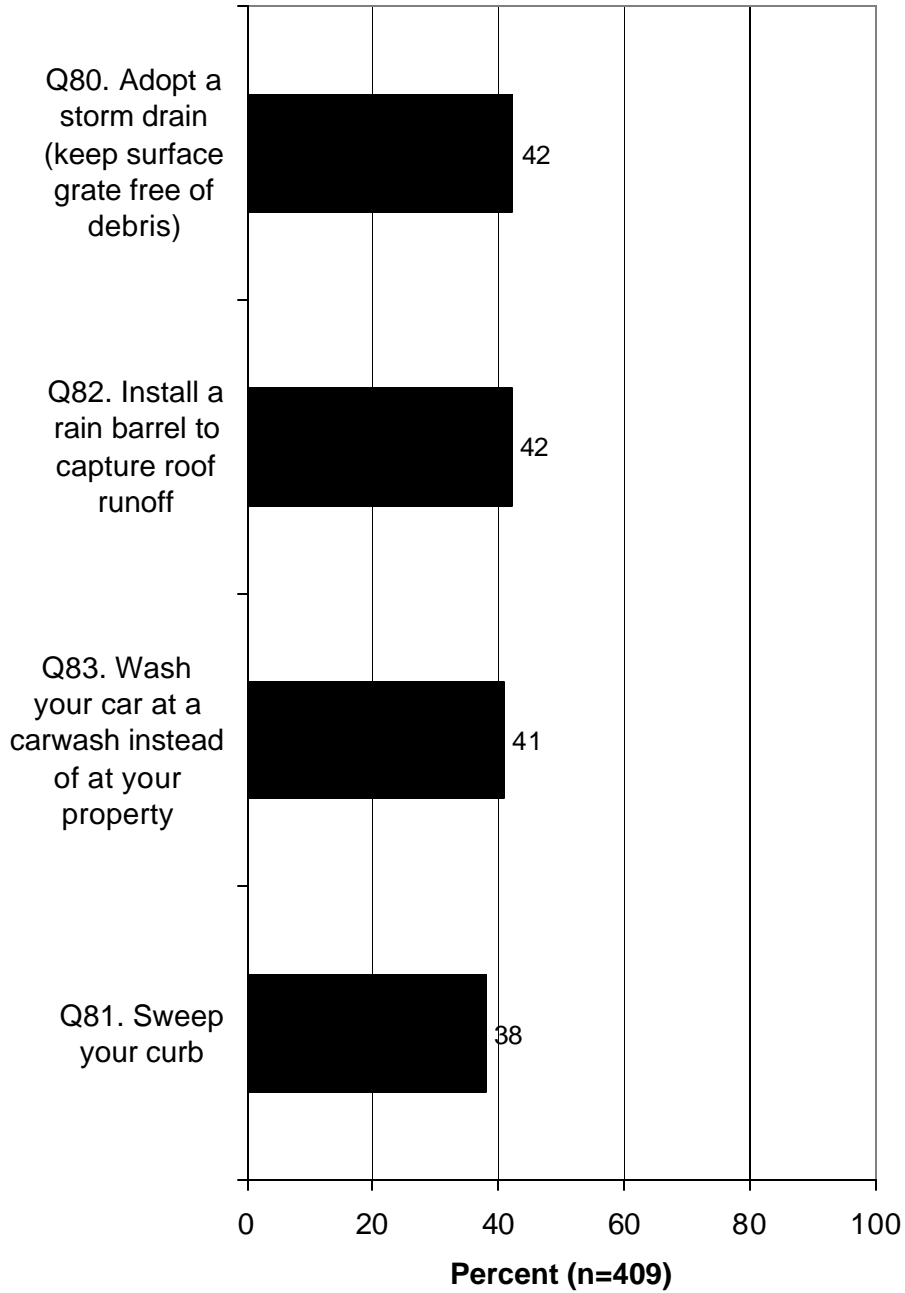
Q72-79. Percent who moderately or strongly oppose the following.



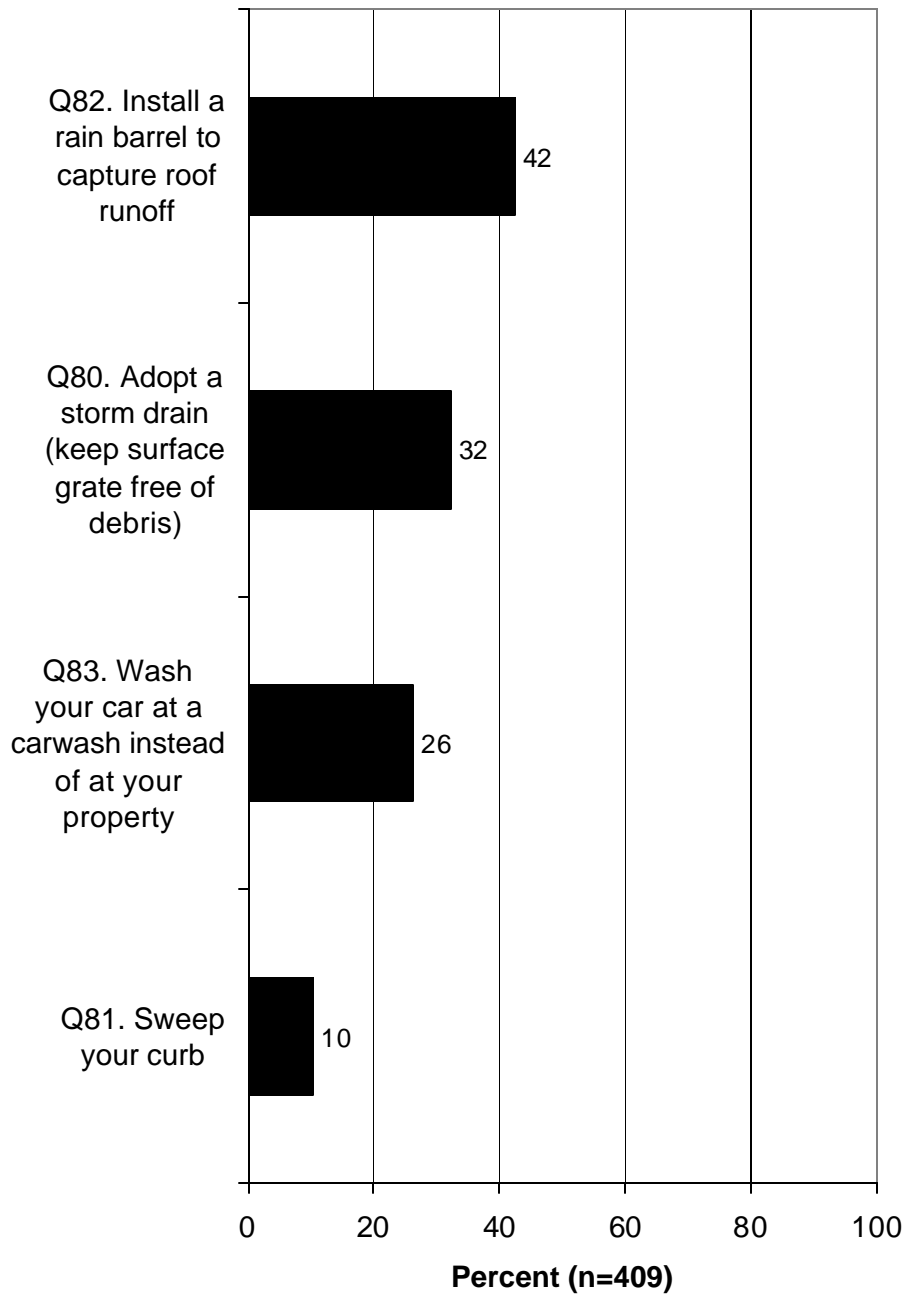
Q72-79. Percent who are not familiar with the following.



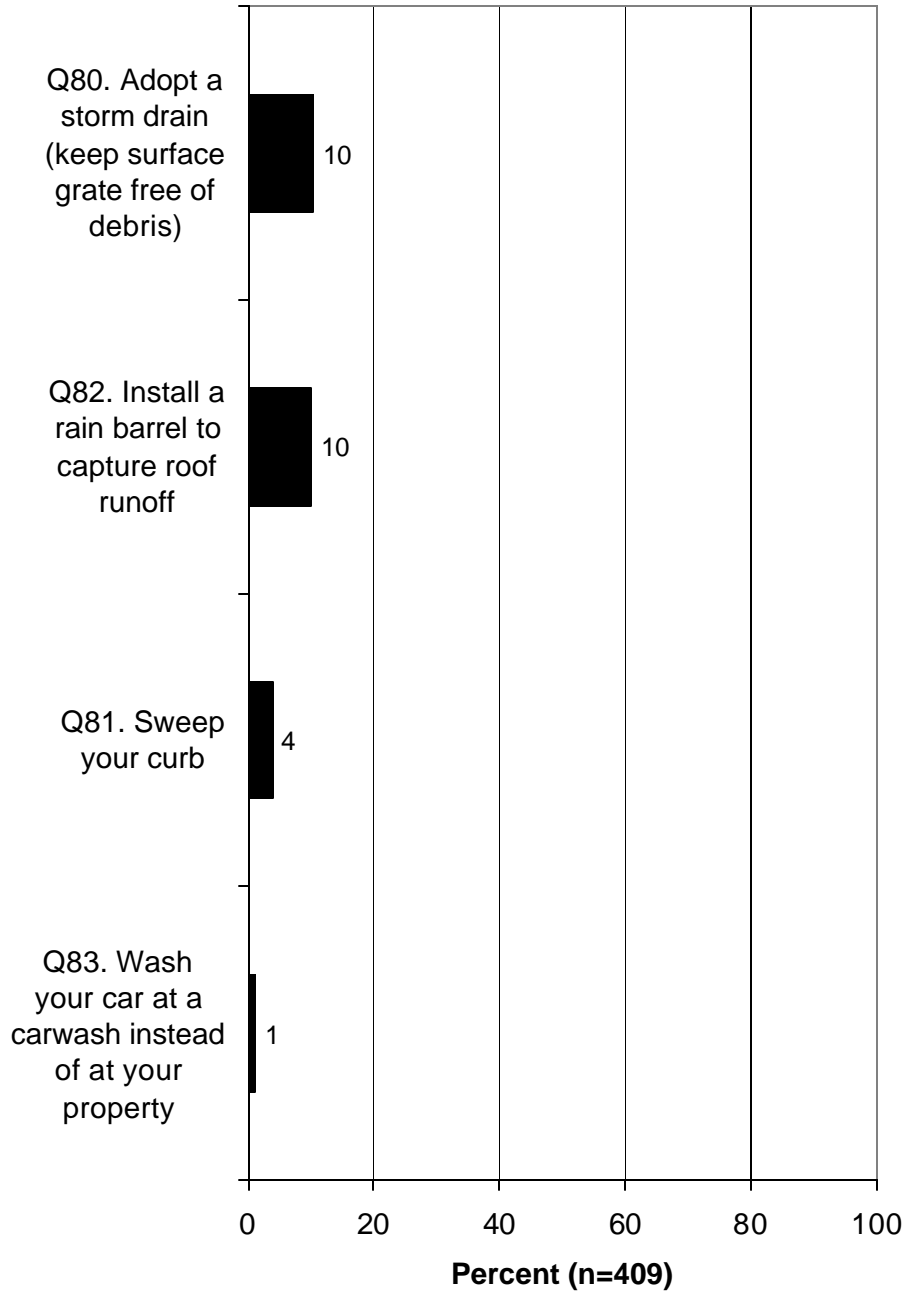
Q80-83. Percent who are very or somewhat likely to do the following.



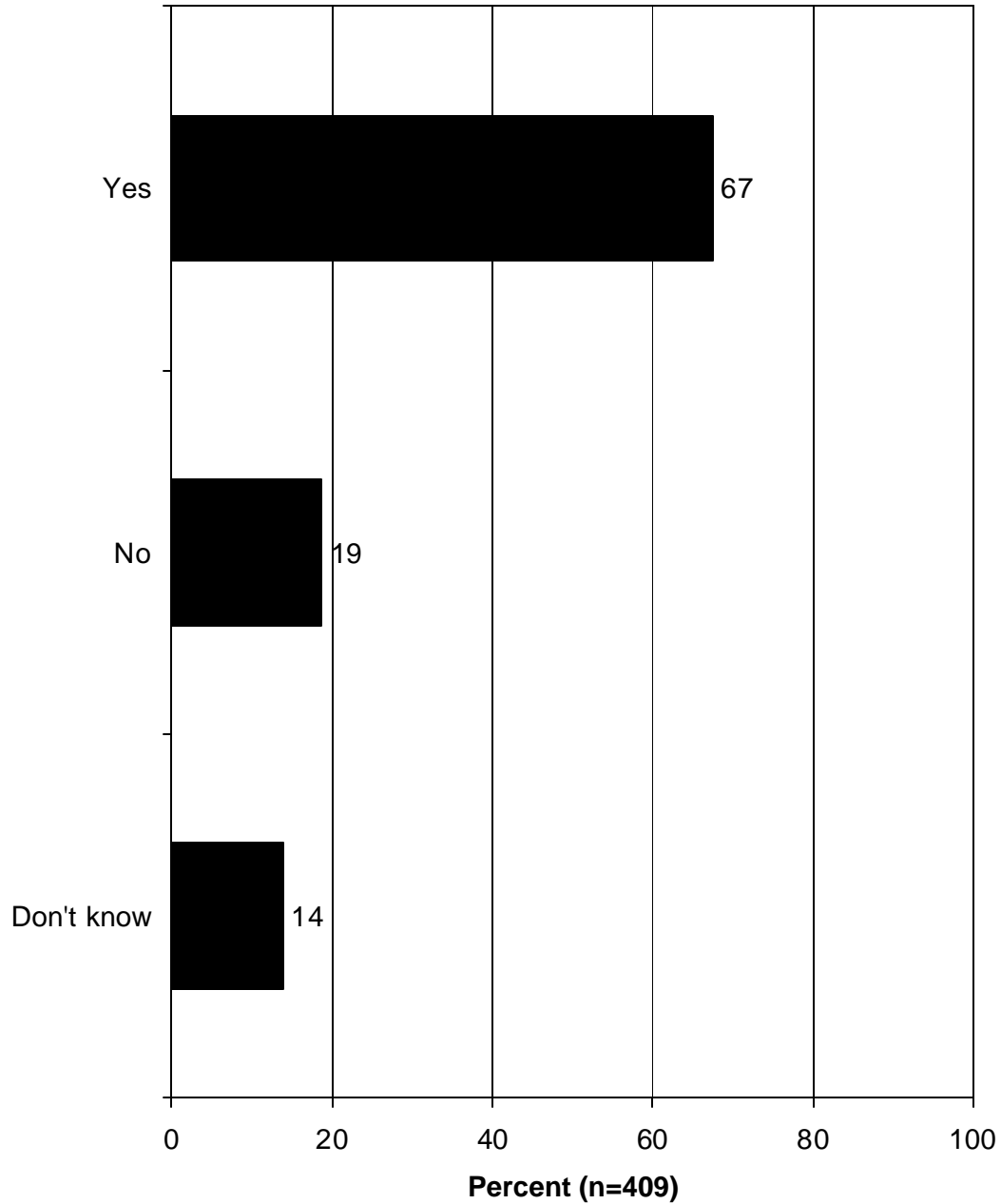
Q80-83. Percent who are somewhat or very unlikely to do the following.



Q80-83. Percent who already do the following.



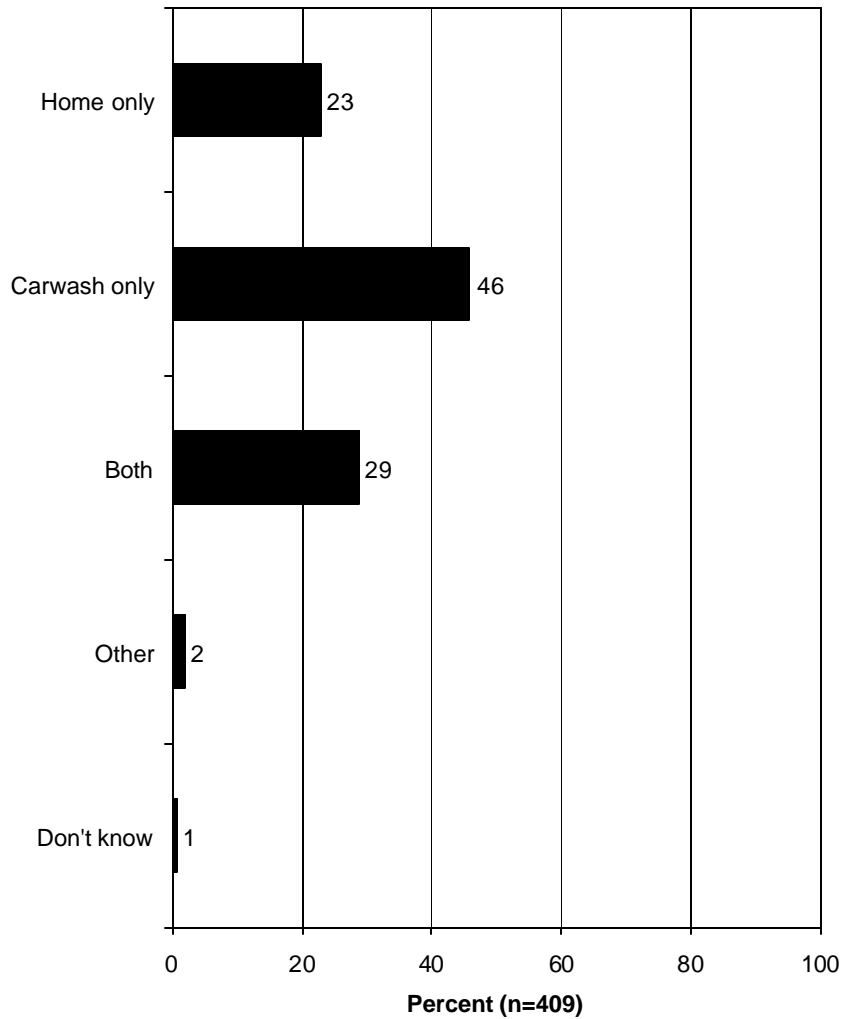
Q86. If improvements are needed to protect water quality from stormwater runoff in your area, would you be willing to pay \$2 per month to make those improvements?



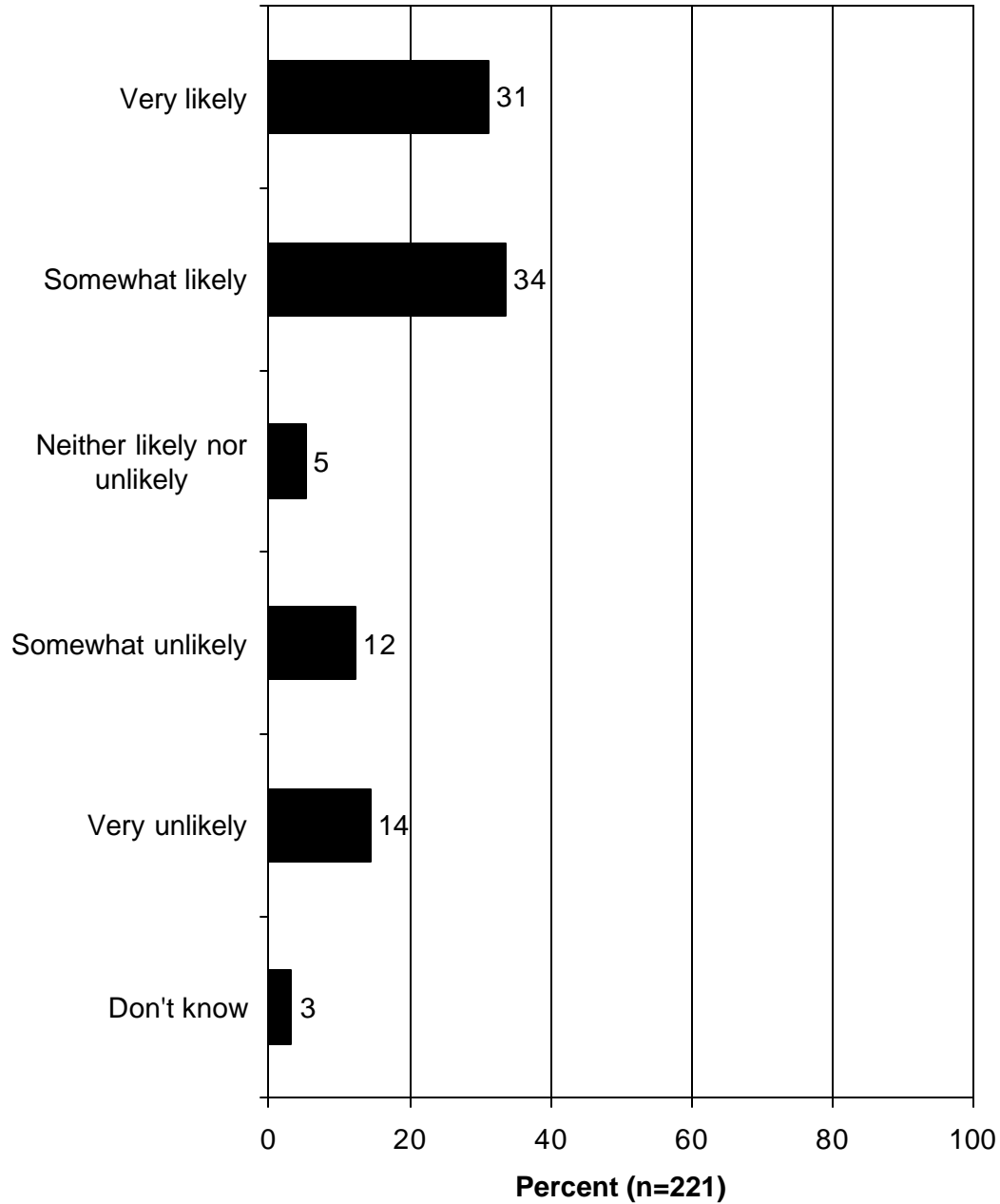
CAR WASHING AND WATER QUALITY

- A plurality of respondents (46%) wash their car at a carwash only (i.e., never at home). The next most common answer is that they wash their car both at a carwash and at home (29%); 23% wash their car exclusively at home. A majority of those who did not wash their car exclusively at a carwash would be likely to wash their car at a carwash if they received reduced-cost coupons to do so.

Q84. Do you currently wash your car at home or at a carwash?



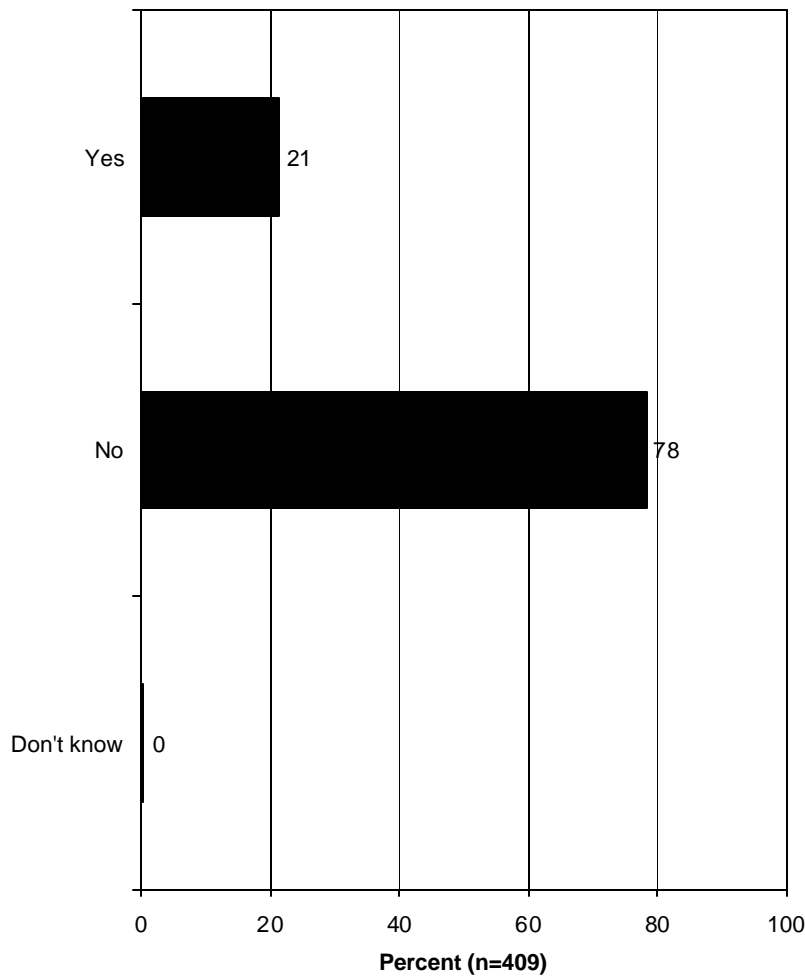
Q85. Would you be likely or unlikely to wash your car at a carwash if you received reduced-cost coupons? (Asked of those who did not wash their car at a carwash.)



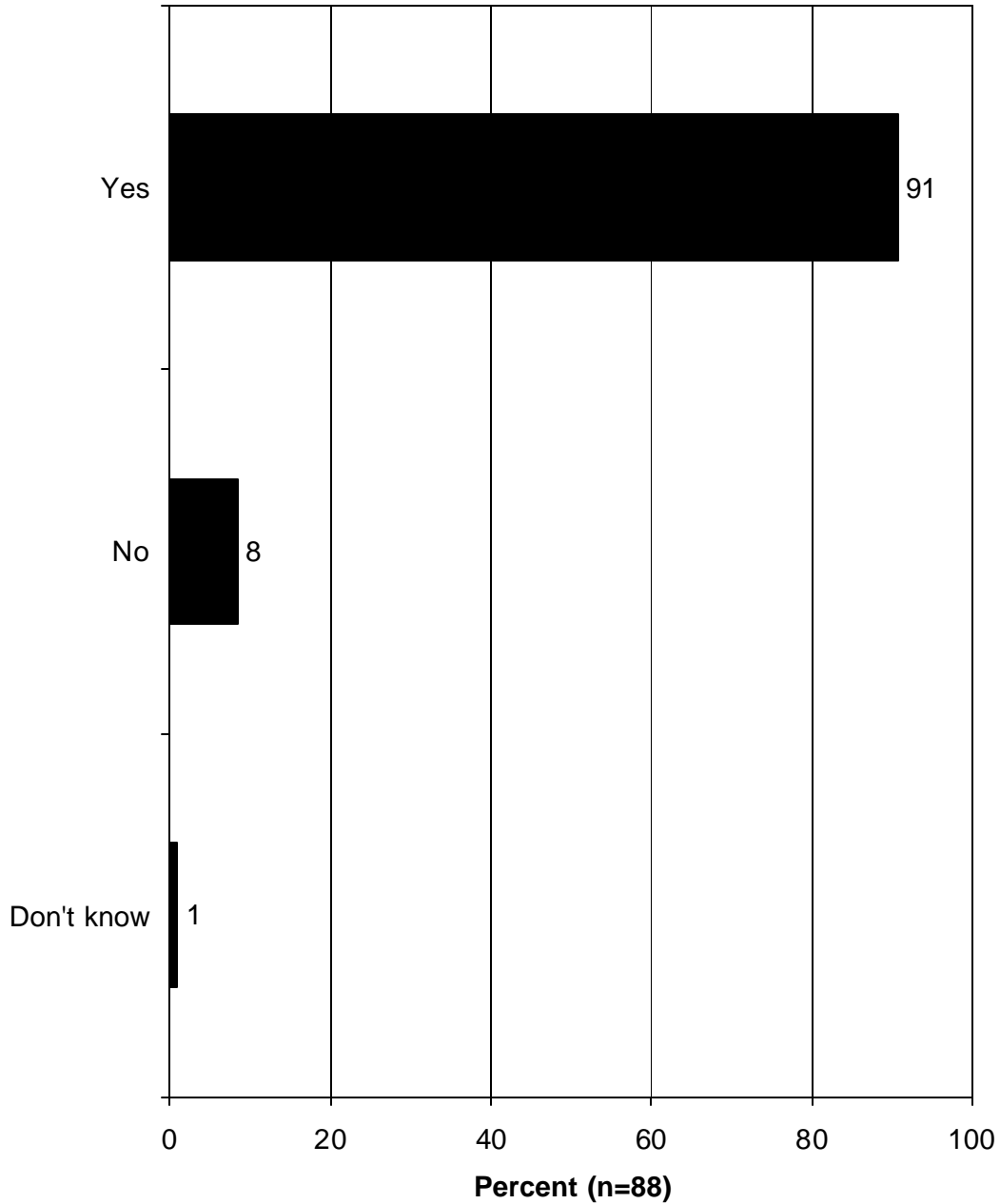
EFFECTS OF PETS ON WATER QUALITY

- A little more than a fifth of respondents (21%) own a dog that they take on walks through their neighborhood. The overwhelming majority (91%) of those who own a dog that they take on walks through their neighborhood clean up their pet’s waste on the walk. Despite this high percentage who already clean up after their dog, 77% said that they would be more likely to clean up their pet’s waste if facilities were provided (including pet waste bags) along the route.

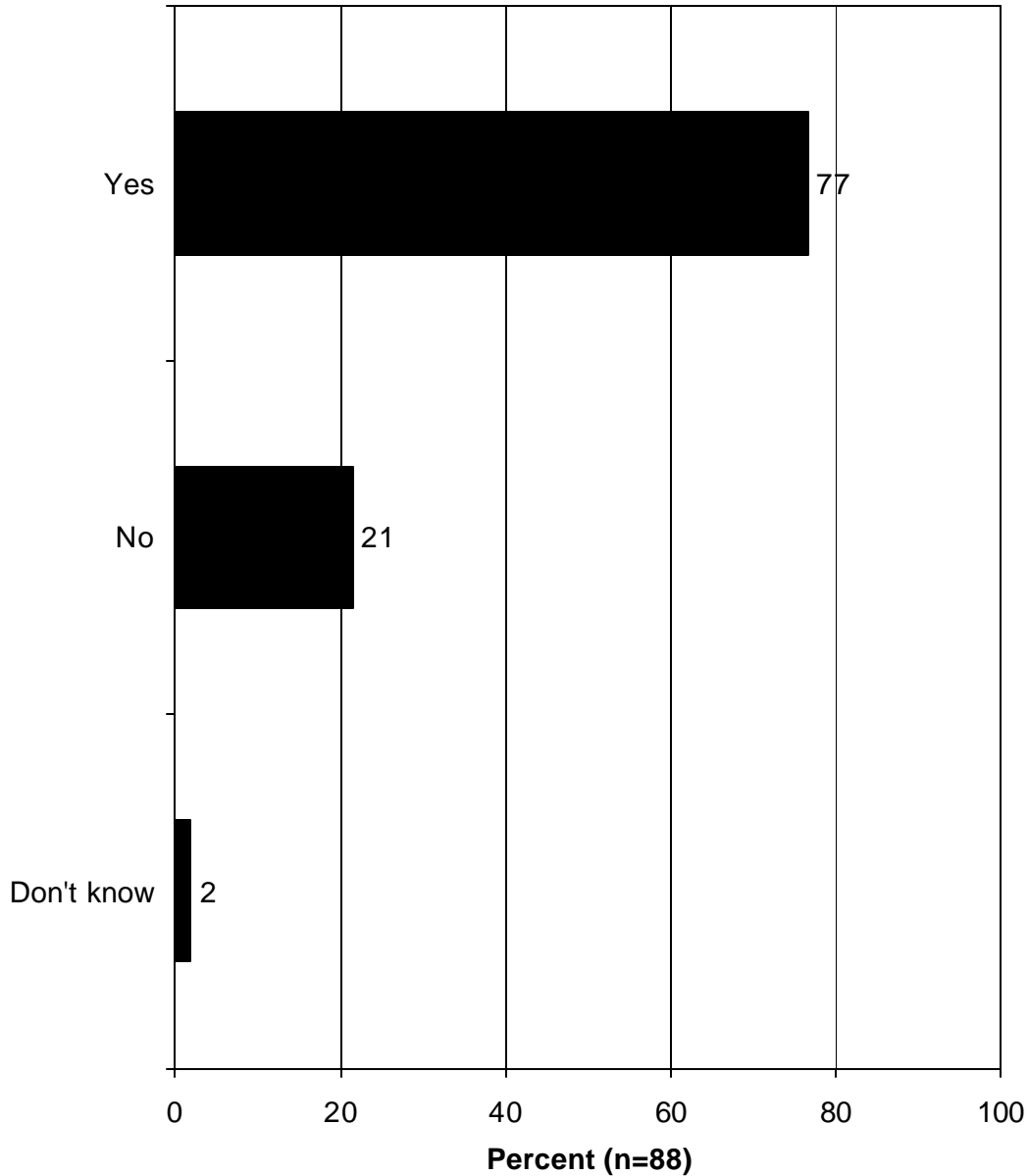
Q87. Do you own a dog that you take on walks through your neighborhood?



Q88. Do you collect pet waste from your dog when you go on a walk? (Asked of those who take a dog on walks through their neighborhood.)



Q89. If facilities were provided along your dog-walking route that included pet waste bags, would you be more likely to collect your pet's waste? (Asked of those who take a dog on walks through their neighborhood.)

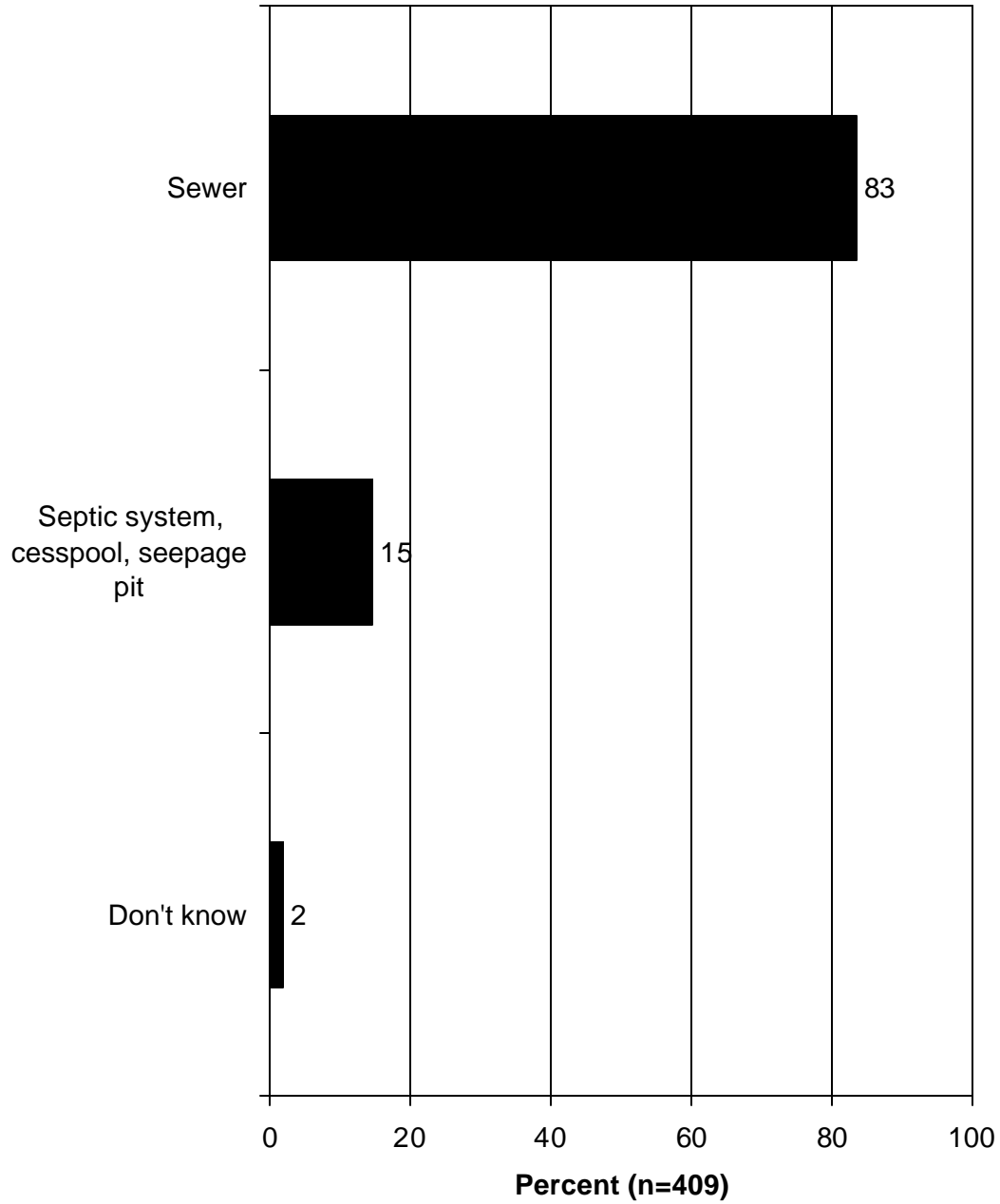


SEWER AND SEPTIC SYSTEMS AND THEIR EFFECTS ON WATER QUALITY

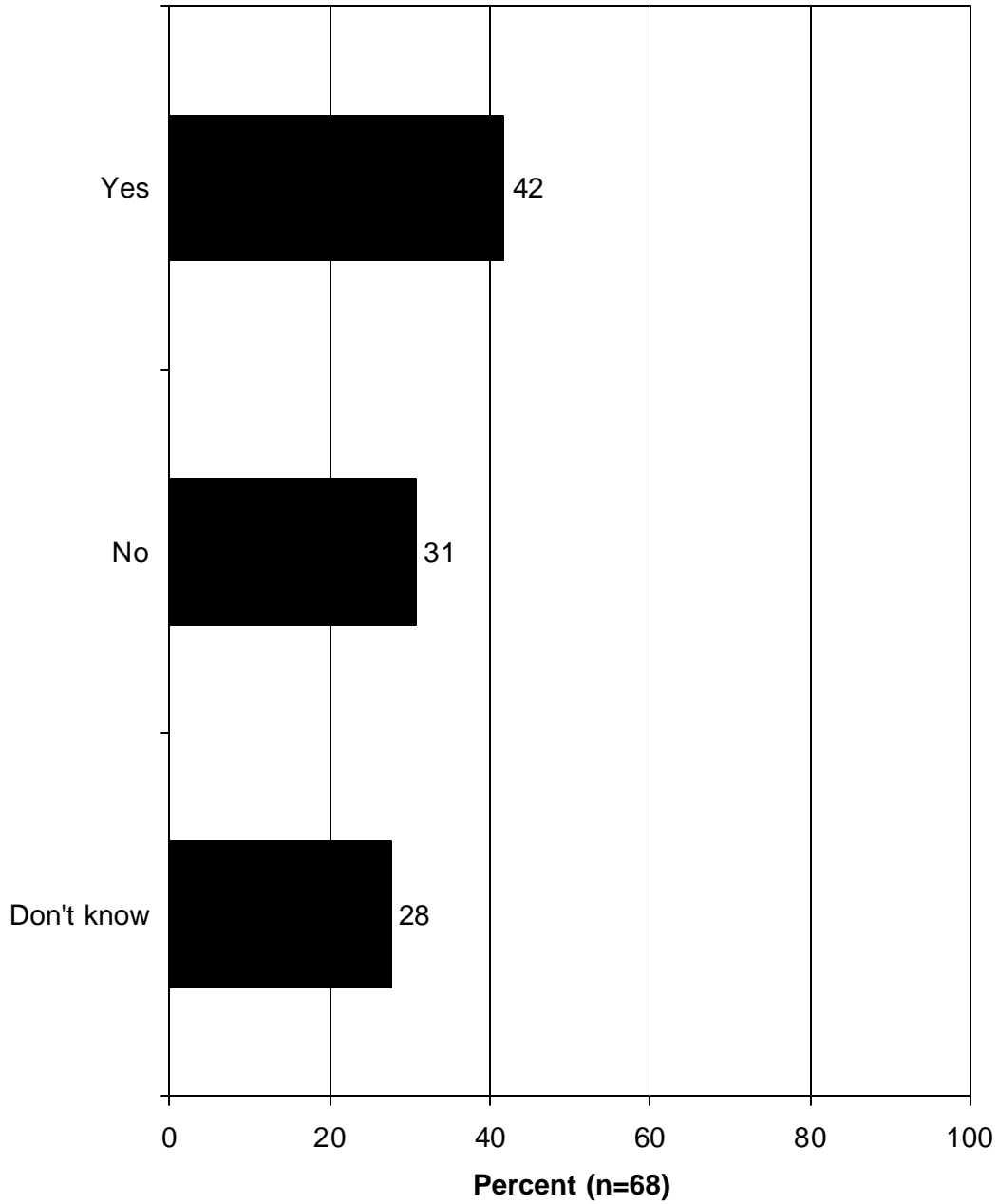
- A very large majority of respondents (83%) indicated that their residence is on a sewer system; 15% said their residence has a septic system, a cesspool, or a seepage pit. Of those not on a sewer system, 42% would like to be on one, while 31% do not wish to be on one (28% did not know). Those not wishing to be on a sewer system cited the cost of switching or the water or sewage fees; however, if the cost of switching to a sewer system were partially defrayed, 60% said that they would be more willing to switch.

- Most respondents (66%) strongly or moderately agreed that owners of an on-site system (e.g., a septic system) should be required to fix problems with the system, possibly at their own expense, if it were shown that the system does not meet state standards and that water quality was being negatively affected by the on-site system. If homeowners had to pay only part of the cost of fixing the aforementioned problem themselves, an even greater percentage agreed (76%) that homeowners should be required to fix the problem.

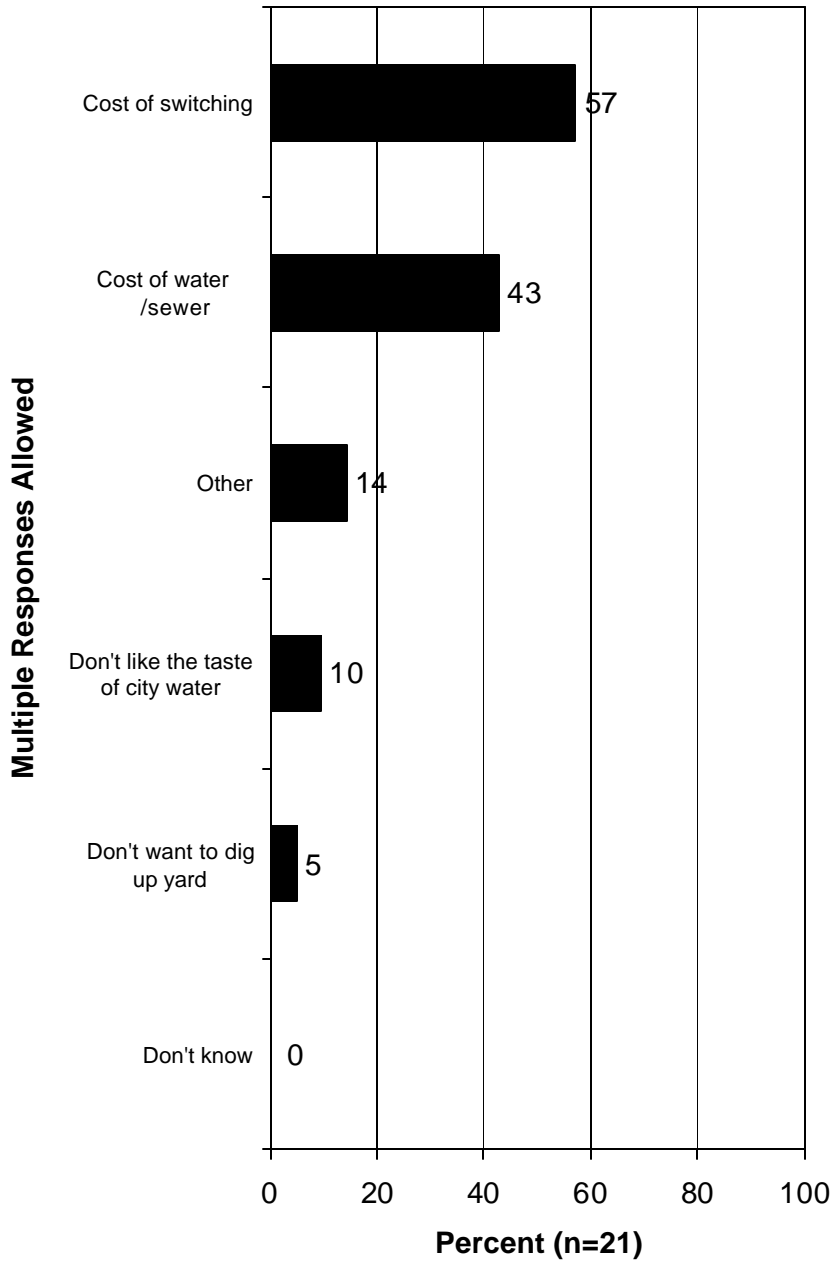
Q90. Are you on a sewer system, or do you have your own septic system, seepage pit, or cesspool?



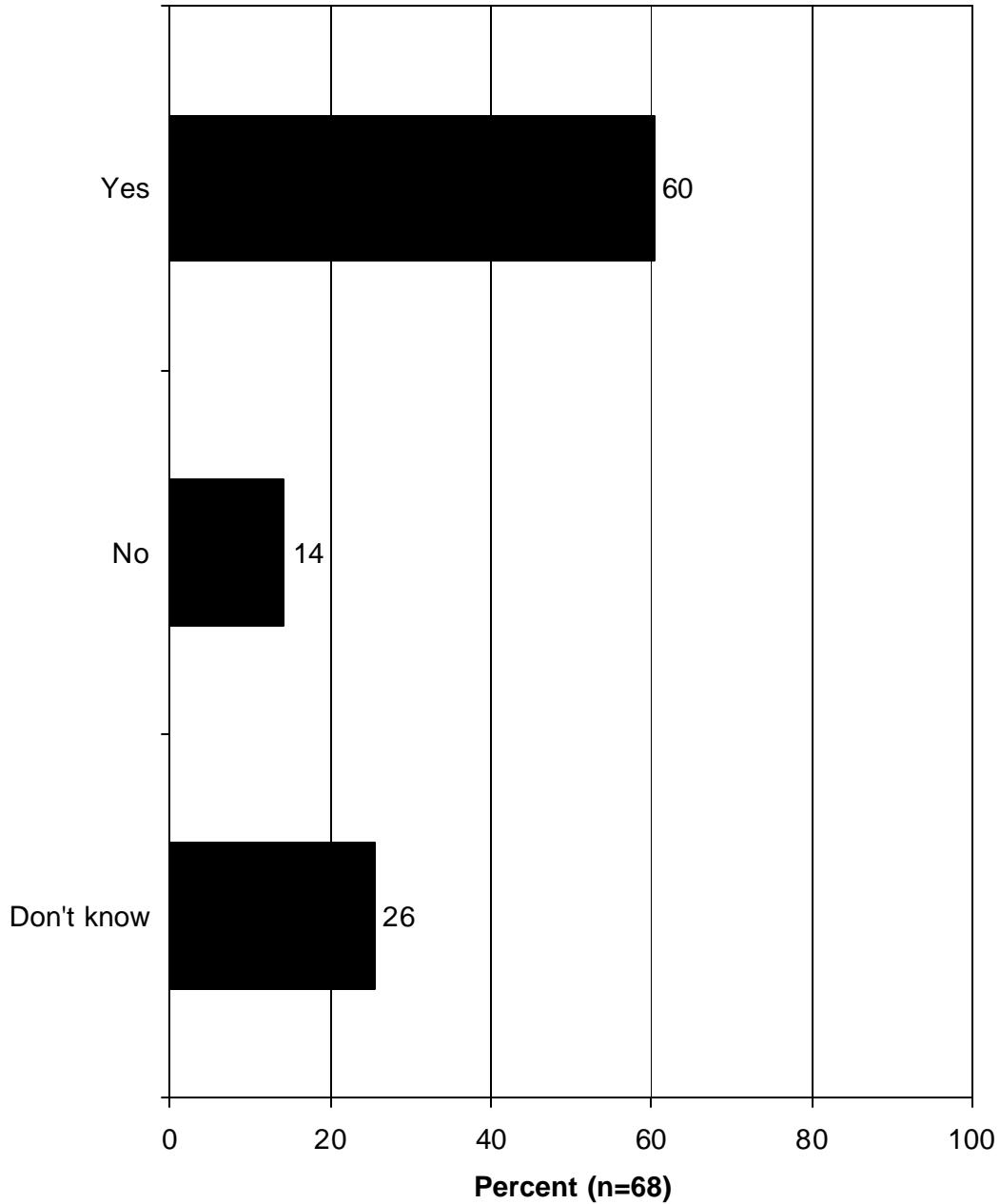
**Q91. Would you prefer to be on a sewer system?
(Asked of those who are not on a sewer system.)**



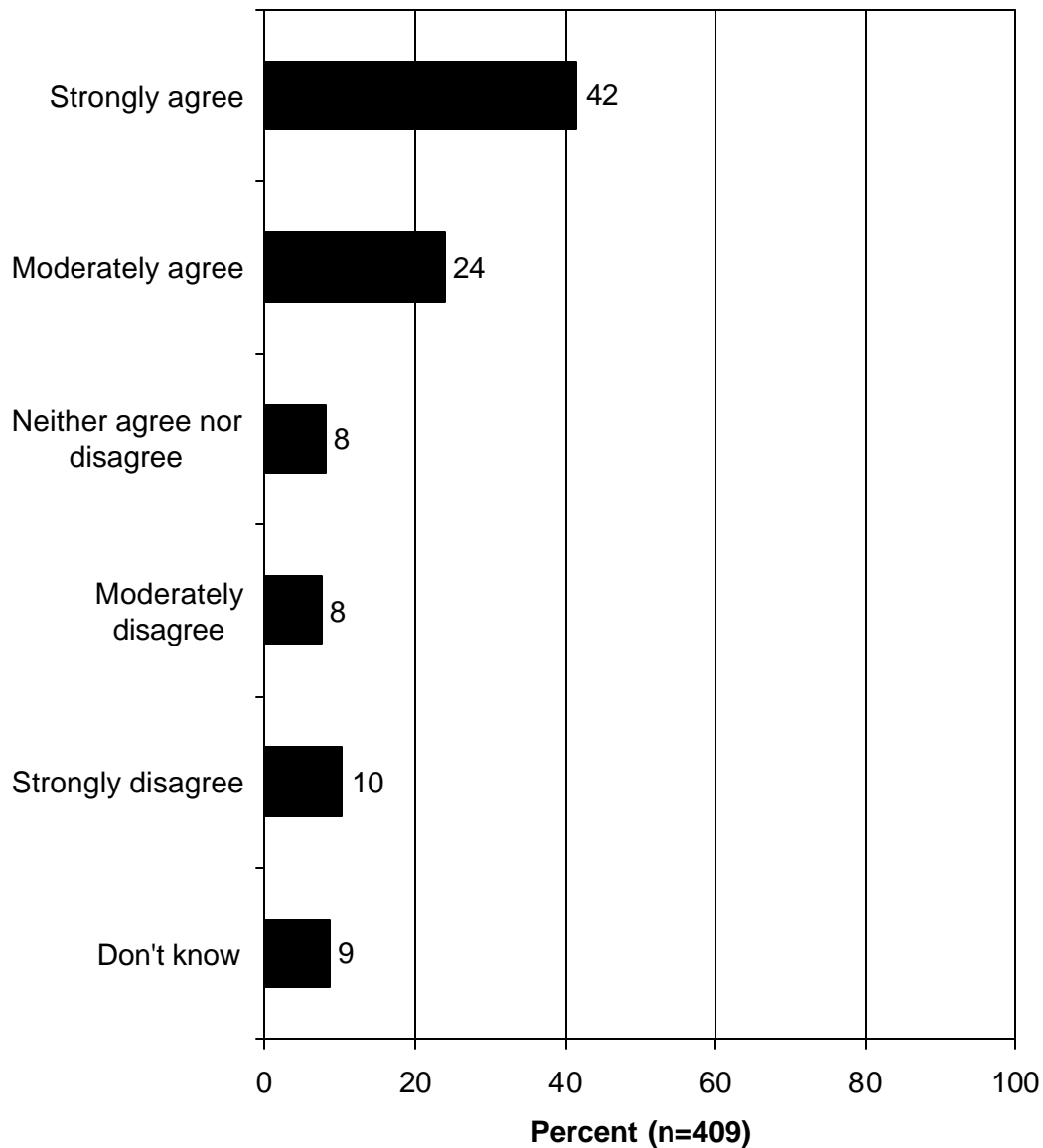
Q93. Why do you not prefer to be on a sewer system? (Asked of those who are not on a sewer system and who prefer not to be on one.)



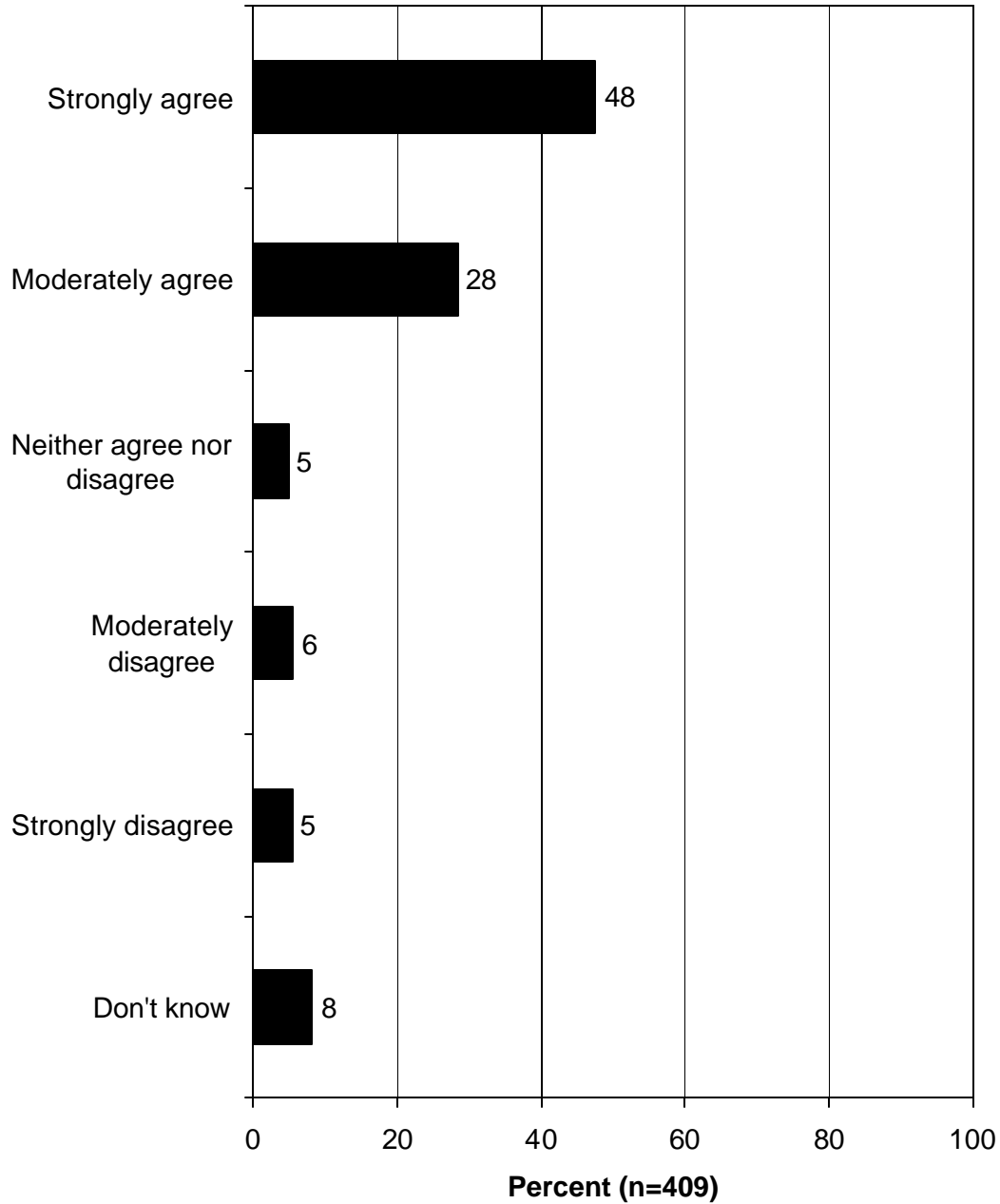
Q95. Would you be more willing to be on a sewer system if the cost of hooking up to a sewer system was partially defrayed? (Asked of those who are not on a sewer system.)



Q96. If you were shown that stream water quality is being affected by on-site systems (like septic systems, cesspools, and seepage pits) that do not meet state standards, do you agree or disagree that owners should be required to fix the problem even if they have to pay for it themselves?



Q97. Do you agree or disagree that owners should be required to fix the problem [of on-site systems that do not meet state standards] if they only have to pay for part of it themselves?

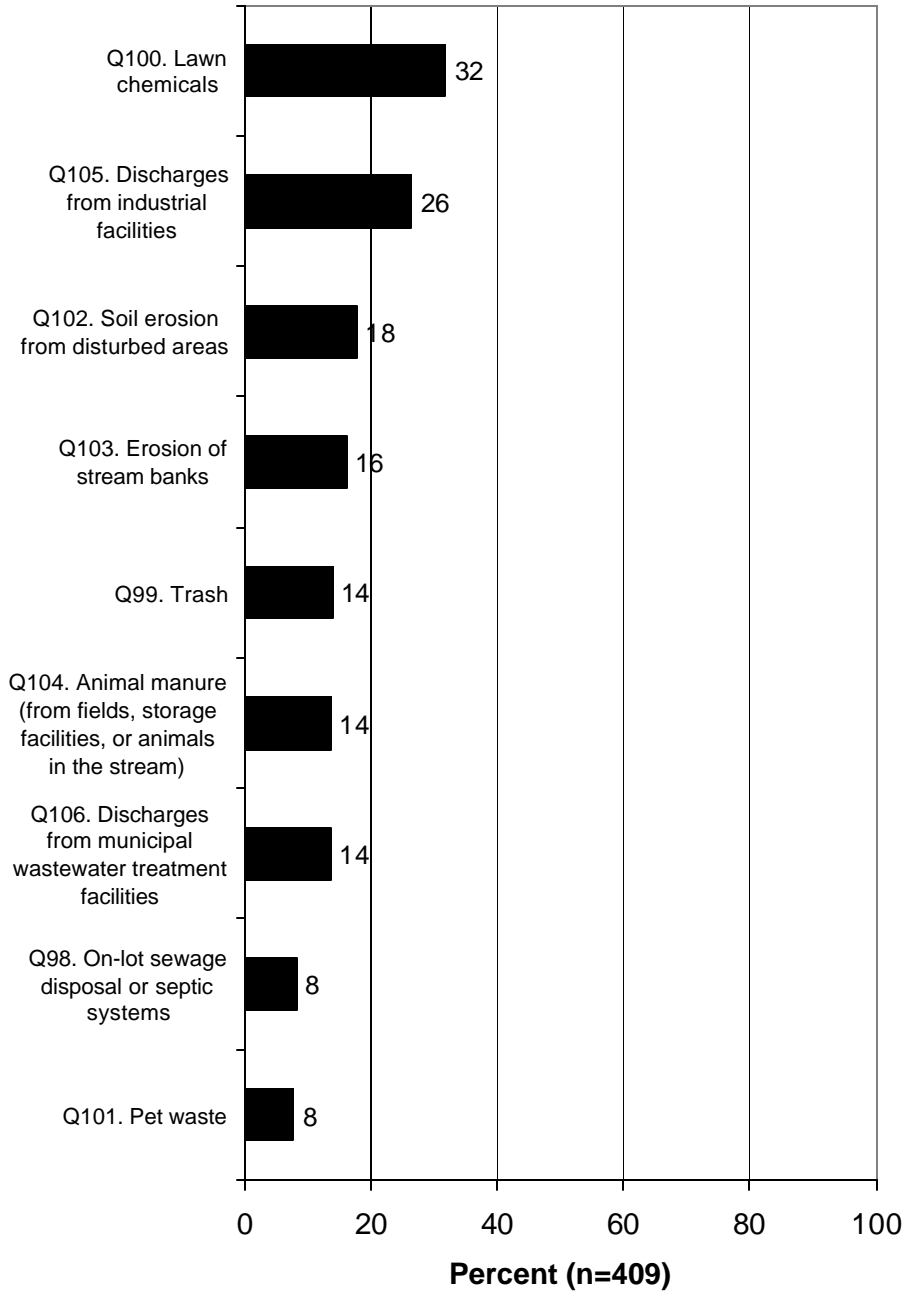


TYPES OF POLLUTION AND THEIR PERCEIVED EFFECTS ON WATER QUALITY

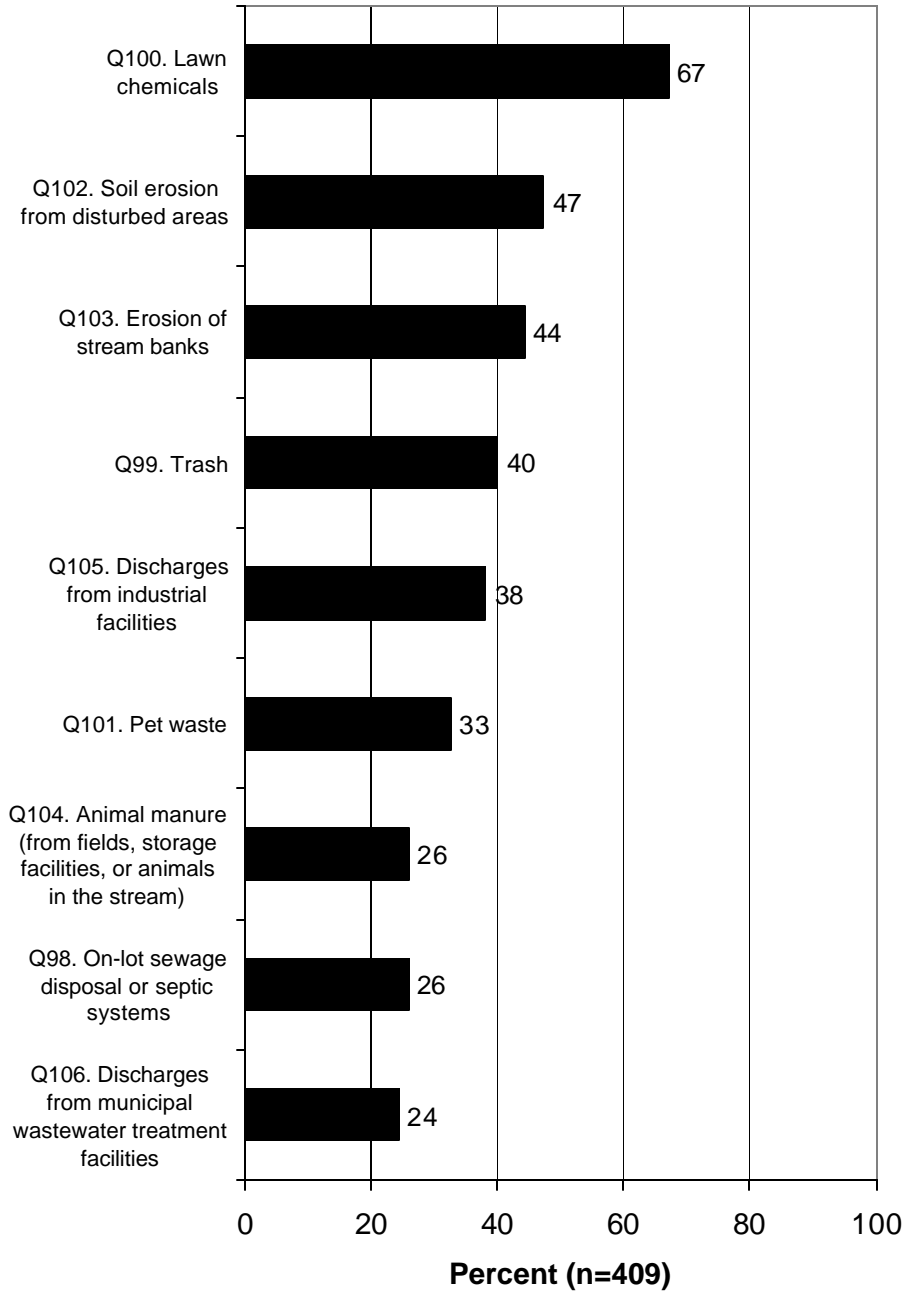
- Respondents were asked about how much nine potential types of water pollution contribute to water pollution of the stream nearest their residence. Lawn chemicals had the greatest percentage (32%) saying it contributes a great deal to the water pollution of the stream nearest their residence, followed by discharges from industrial facilities (26%). Pet waste (8%) and septic systems (8%) had the lowest percentage saying that they contribute to water pollution of the stream nearest their residence.

- Regarding the potential types of water pollution that respondents say contribute not at all to water pollution of the stream nearest their residence, the top answers were discharges from municipal wastewater treatment facilities (43% says they contribute not at all), discharges from industrial facilities (38%), animal manure (35%), and septic systems (34%).

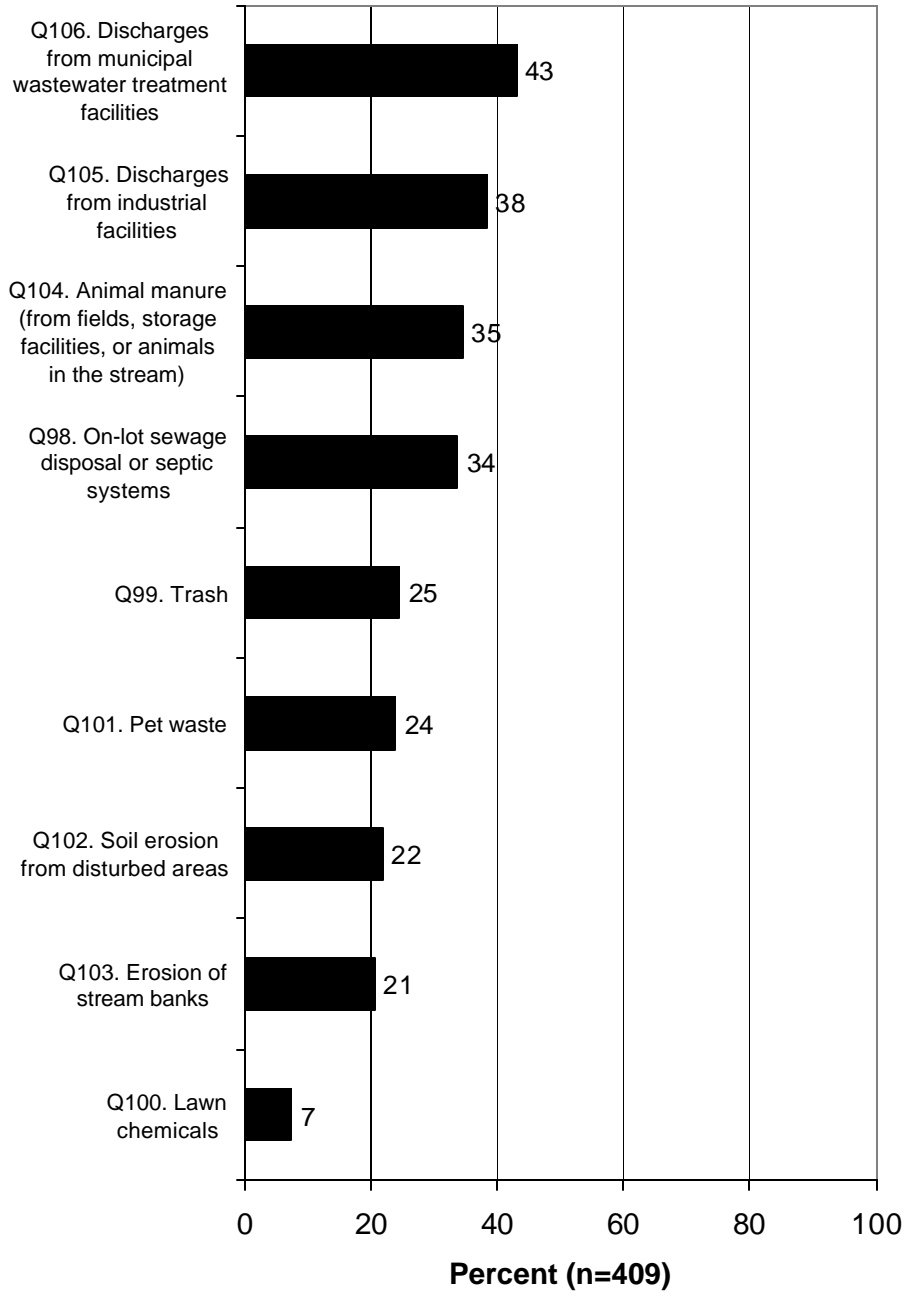
Q98-106. Percent who said that the following contributes a great deal to water pollution in the streams nearest their neighborhood.



Q98-106. Percent who said that the following contributes a great deal or moderate amount to water pollution in the streams nearest their neighborhood.



Q98-106. Percent who said that the following contributes not at all to water pollution in the streams nearest their neighborhood.

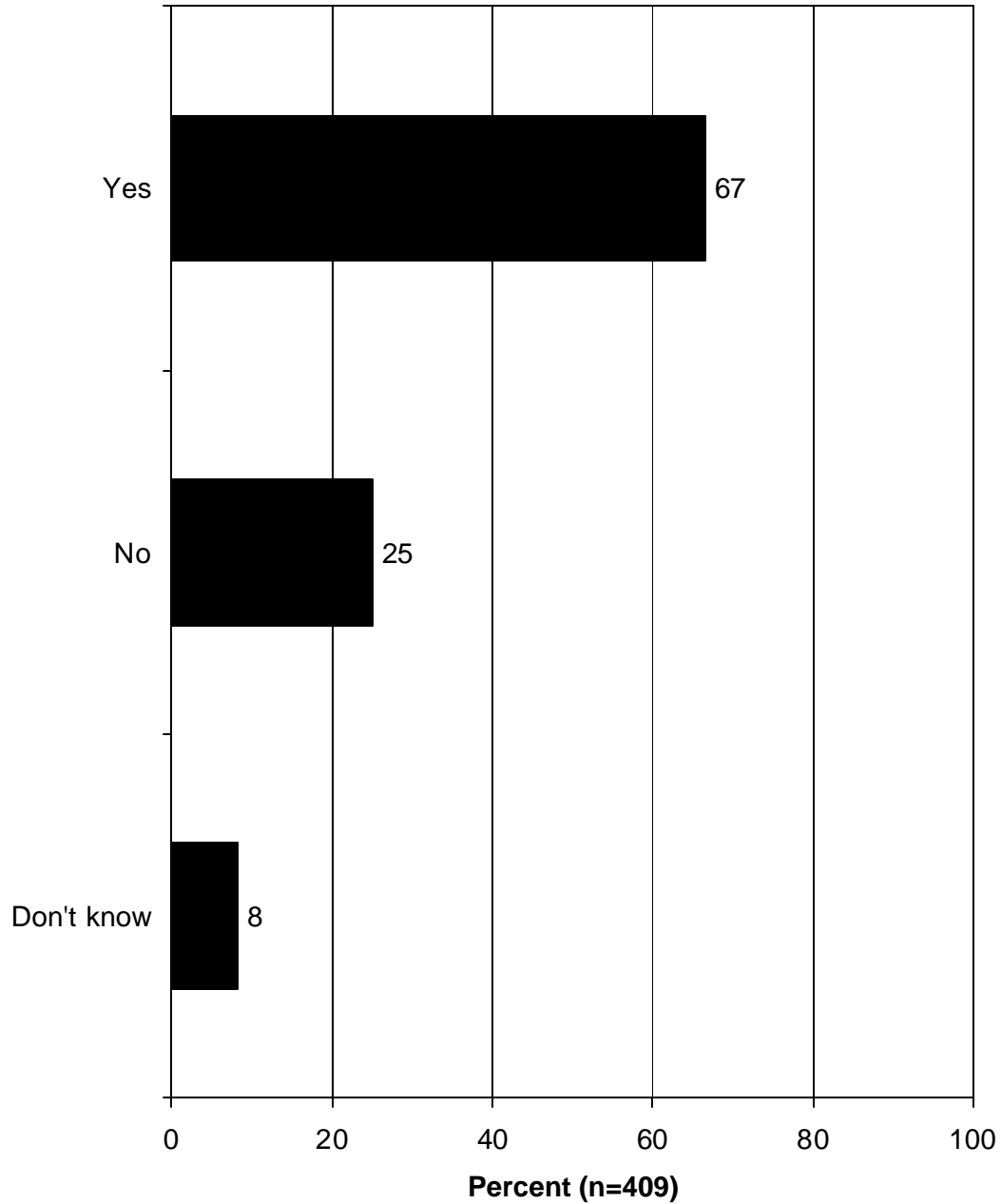


PUBLIC INPUT TO HELP SHAPE STREAM AND WATER QUALITY, AND WAYS TO PROVIDE INFORMATION TO RESPONDENT

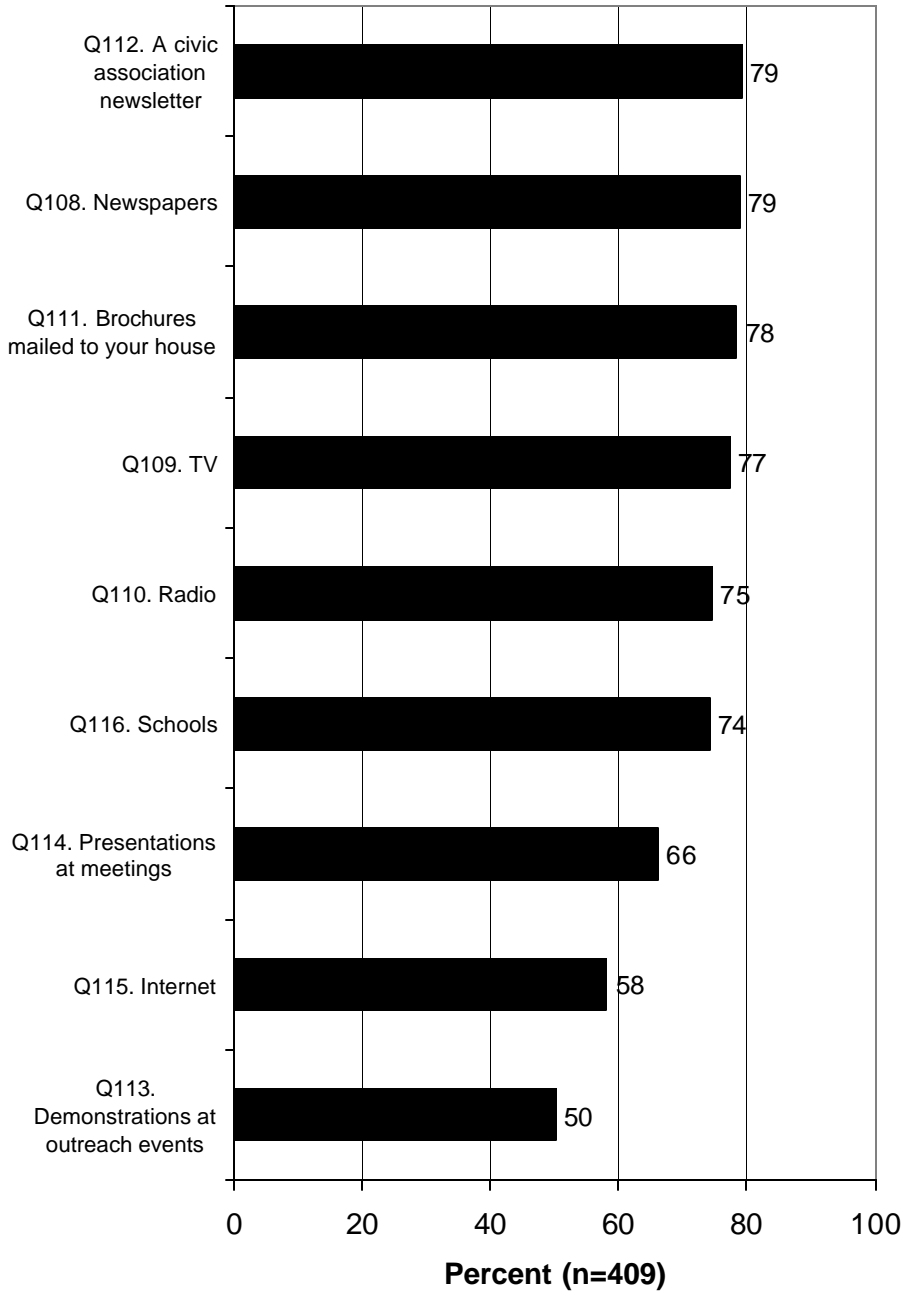
- Two-thirds (67%) would be interested in providing input to the DNREC regarding stream and water quality protection strategies.

- Regarding effectiveness of mediums to provide information to the respondent regarding water quality and ways to protect water quality, the greatest percentage of respondents said the following would be very or somewhat effective ways to provide them with information:
 - a civic association newsletter (79%),
 - newspapers (79%),
 - brochures mailed to the respondent's house (78%),
 - TV (77%),
 - radio (75%), and
 - schools (74%).

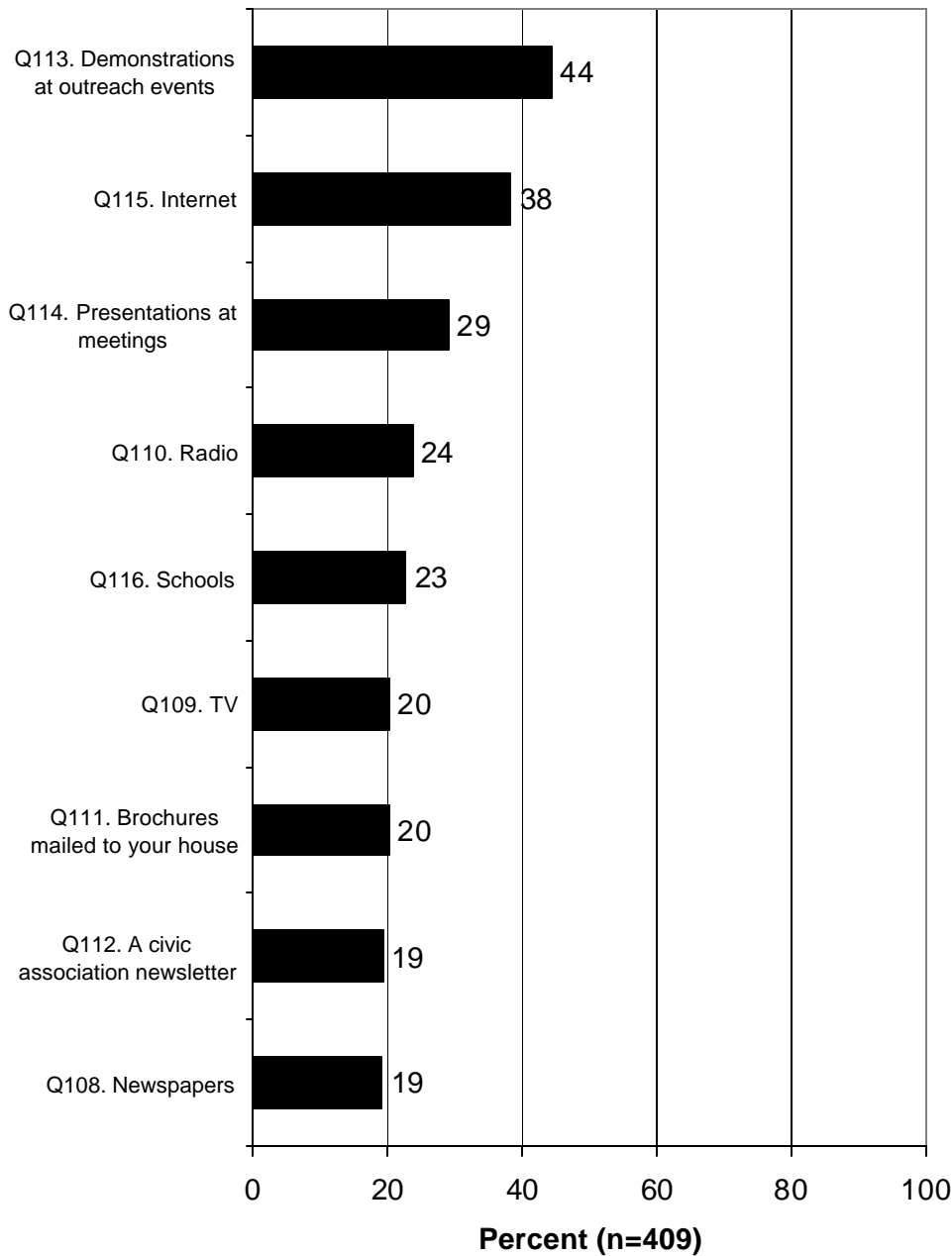
Q107. If you knew that DNREC was seeking public input to help shape stream and water quality protection strategies in your area, would you be interested in providing input?



Q108-116. Percent who think the following are very or somewhat effective ways for DNREC to provide them with information regarding water quality and ways to protect water quality.



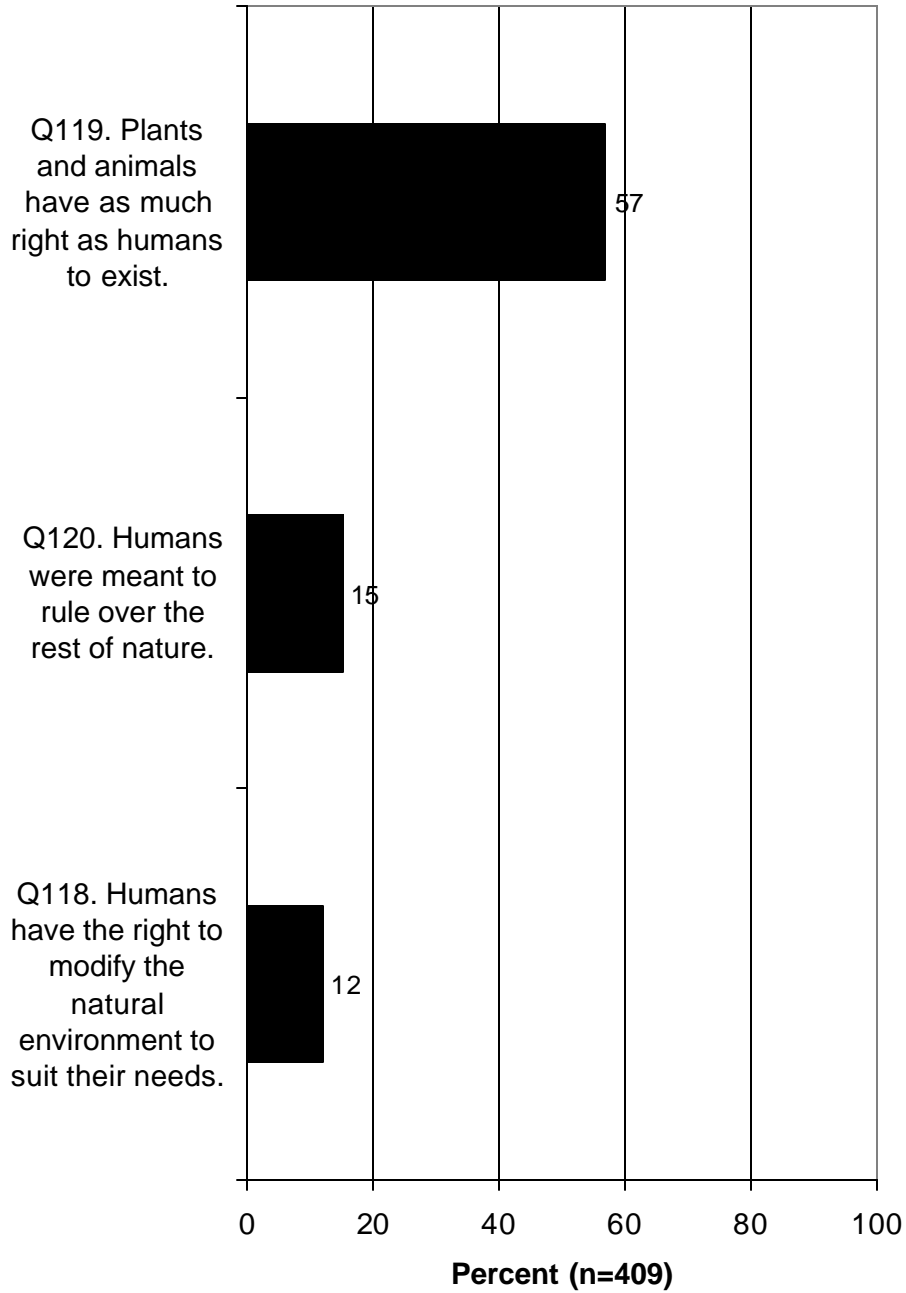
Q108-116. Percent who think the following are not at all effective ways for DNREC to provide them with information regarding water quality and ways to protect water quality.



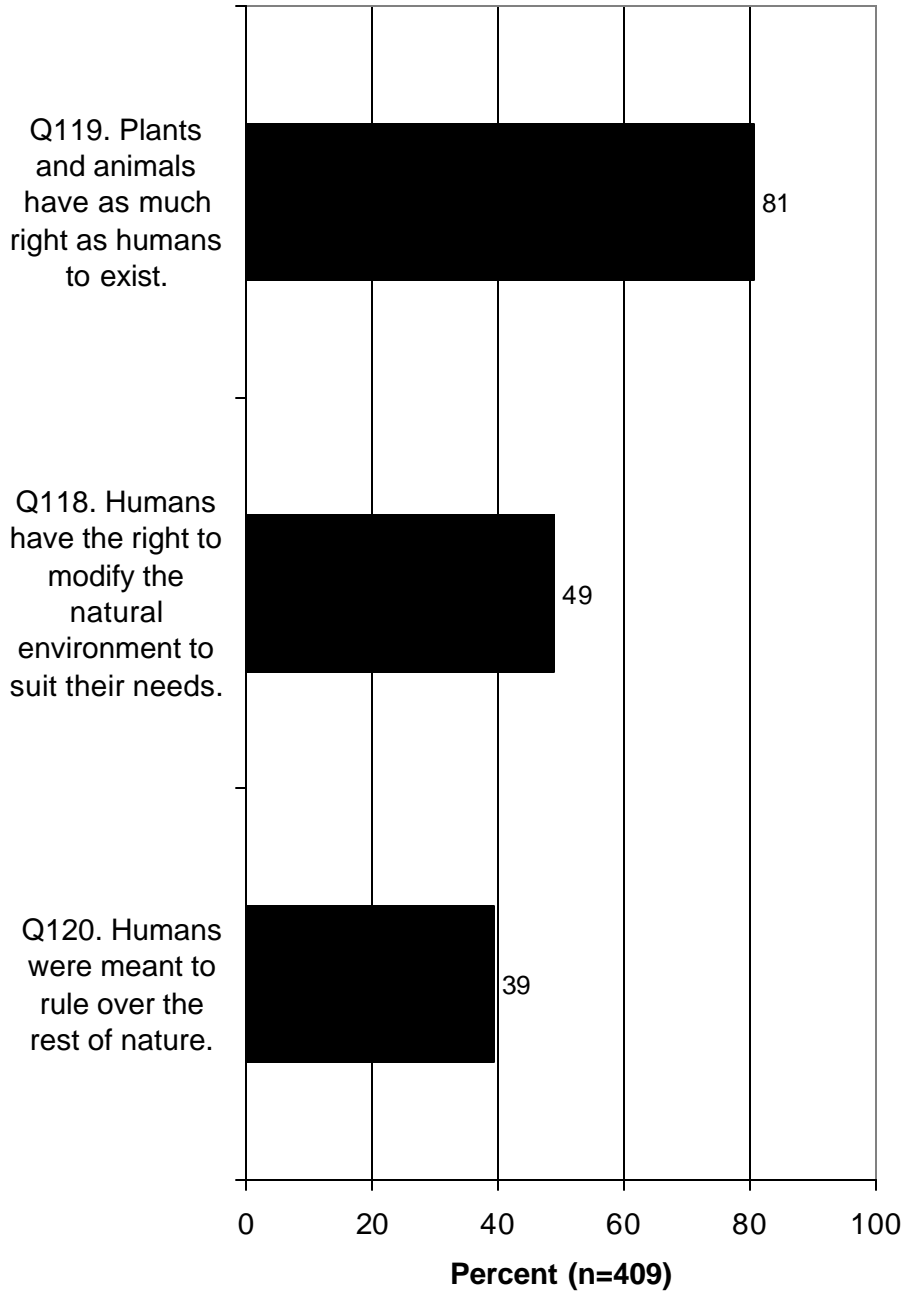
OPINIONS ON GENERAL STATEMENTS ABOUT NATURAL RESOURCES

- Respondents were asked about whether they agreed or disagreed with three statements about natural resources. A majority agreed (81%, with 57% strongly agreeing) that plants and animals have as much right to exist as humans do; lower percentages agreed that humans have the right to modify the natural environment to suit their needs (49%, with 12% strongly agreeing) or that humans were meant to rule over nature (39%, with 15% strongly agreeing). Meanwhile, in looking at the converse, half of respondents (50%) moderately or strongly disagreed that humans were meant to rule over nature; 40% moderately or strongly disagreed that humans have the right to modify the natural environment to suit their needs.

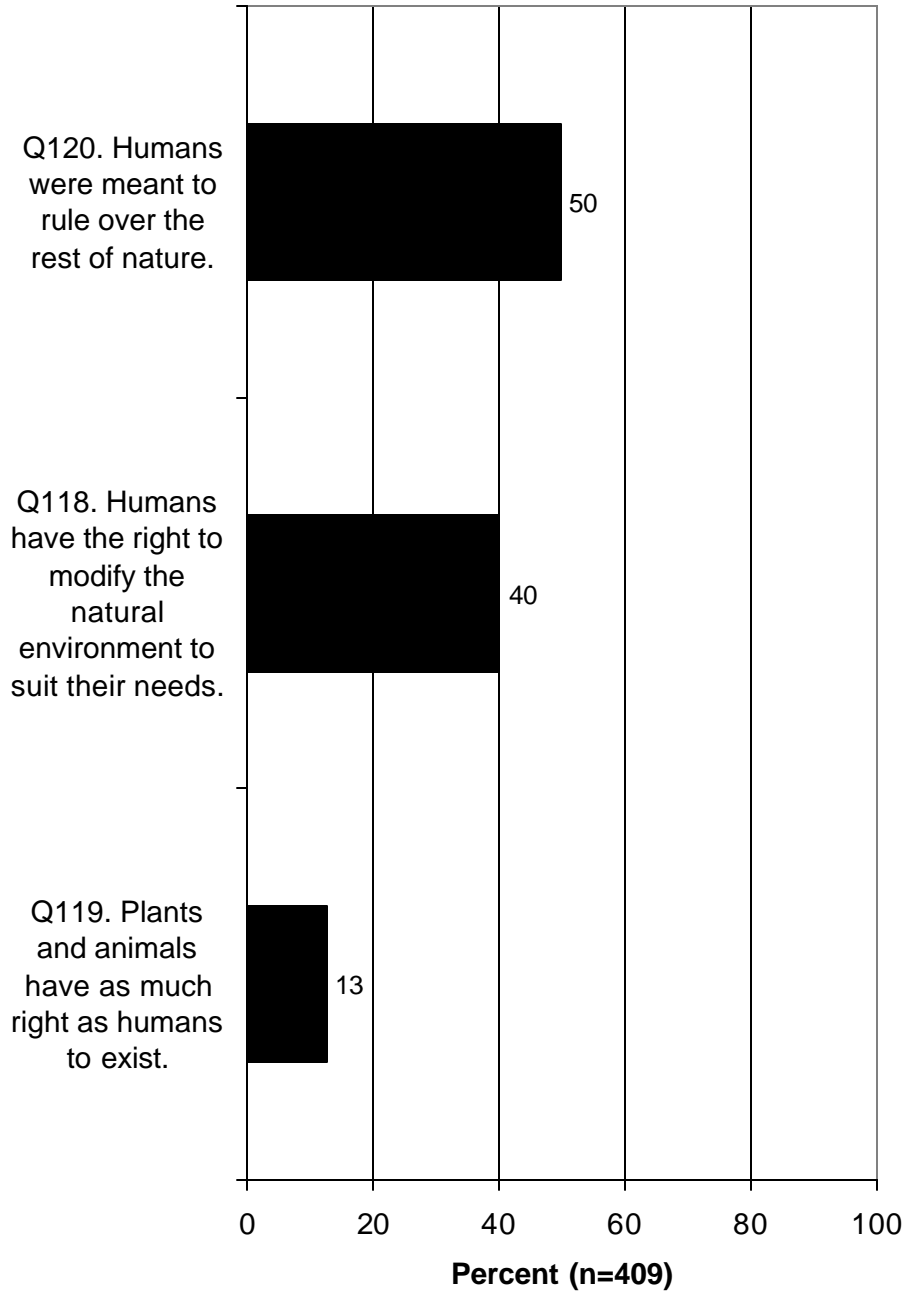
Q118-120. Percent who strongly agree with the following statements.



Q118-120. Percent who strongly or moderately agree with the following statements.



Q118-120. Percent who moderately or strongly disagree with the following statements.



NEIGHBORHOOD ASSOCIATION MEMBERSHIP, DEMOGRAPHIC DATA, AND HOUSING DATA

- A large majority of respondents (69%) were part of a neighborhood association.

- A majority of respondents (78%) lived in a single-family house, either with a lot size of less than half an acre (45%) or a lot size of half an acre or larger (33%). Together, apartments and condos accounted for 14% of respondents' residences.

- The overwhelming majority of respondents (83%) own their home.

- A plurality of respondents (43%) indicated that their home is more than 30 years old.

- A fifth of respondents (20%) indicated that they had been no further than high school (with or without getting a diploma); 73% indicated that they had attended college, with or without obtaining a degree.

- A graph is included showing respondents' professions; a plurality said that they were retired (24%).

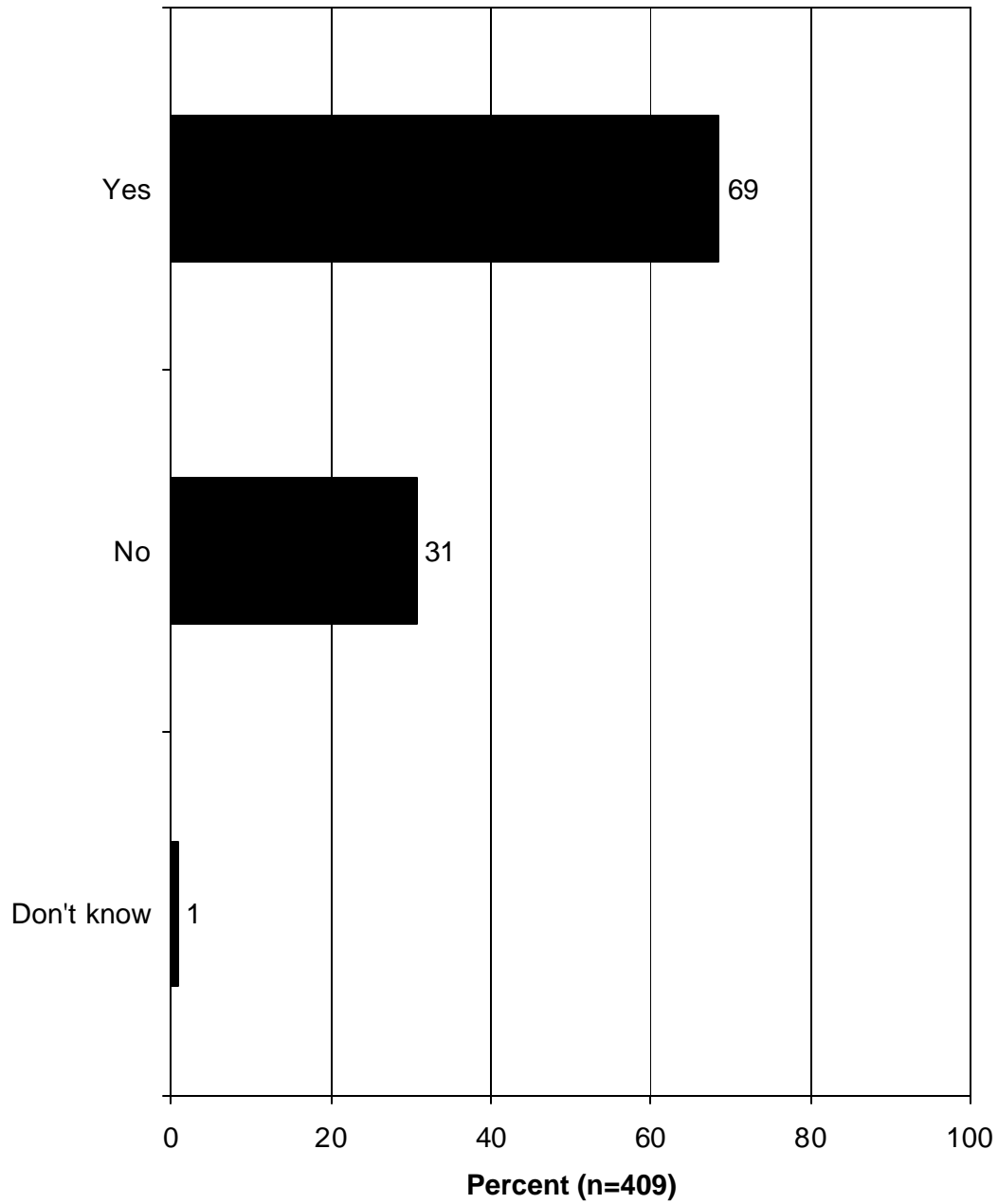
- Household incomes were fairly evenly distributed among income categories.

- The ages of respondents were skewed to the older age groups; the mean age was 51.4 years.

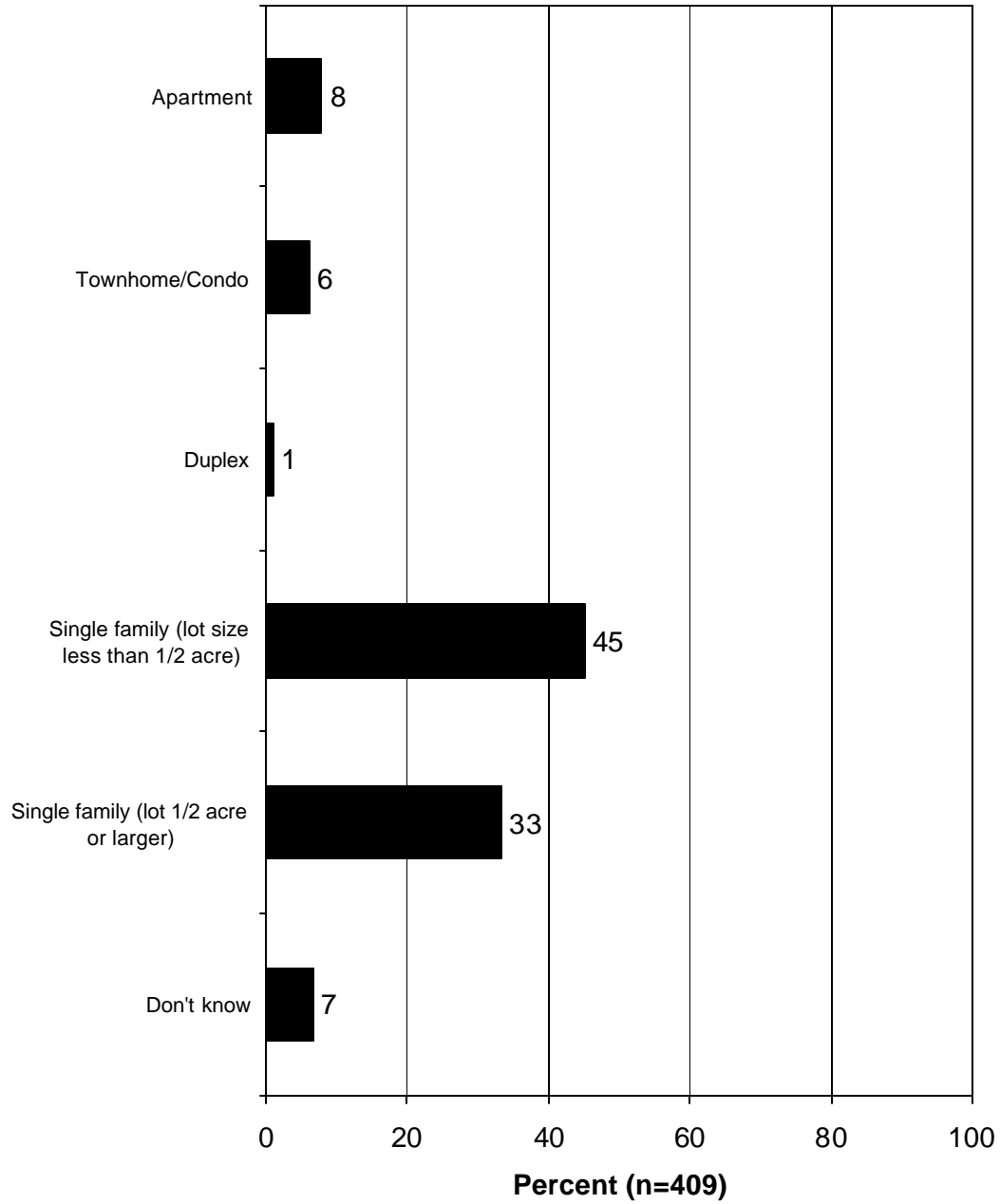
- The mean of the number of people living in the household (including the respondent) is 2.88 people.

- Respondents' tracts are shown, as well.

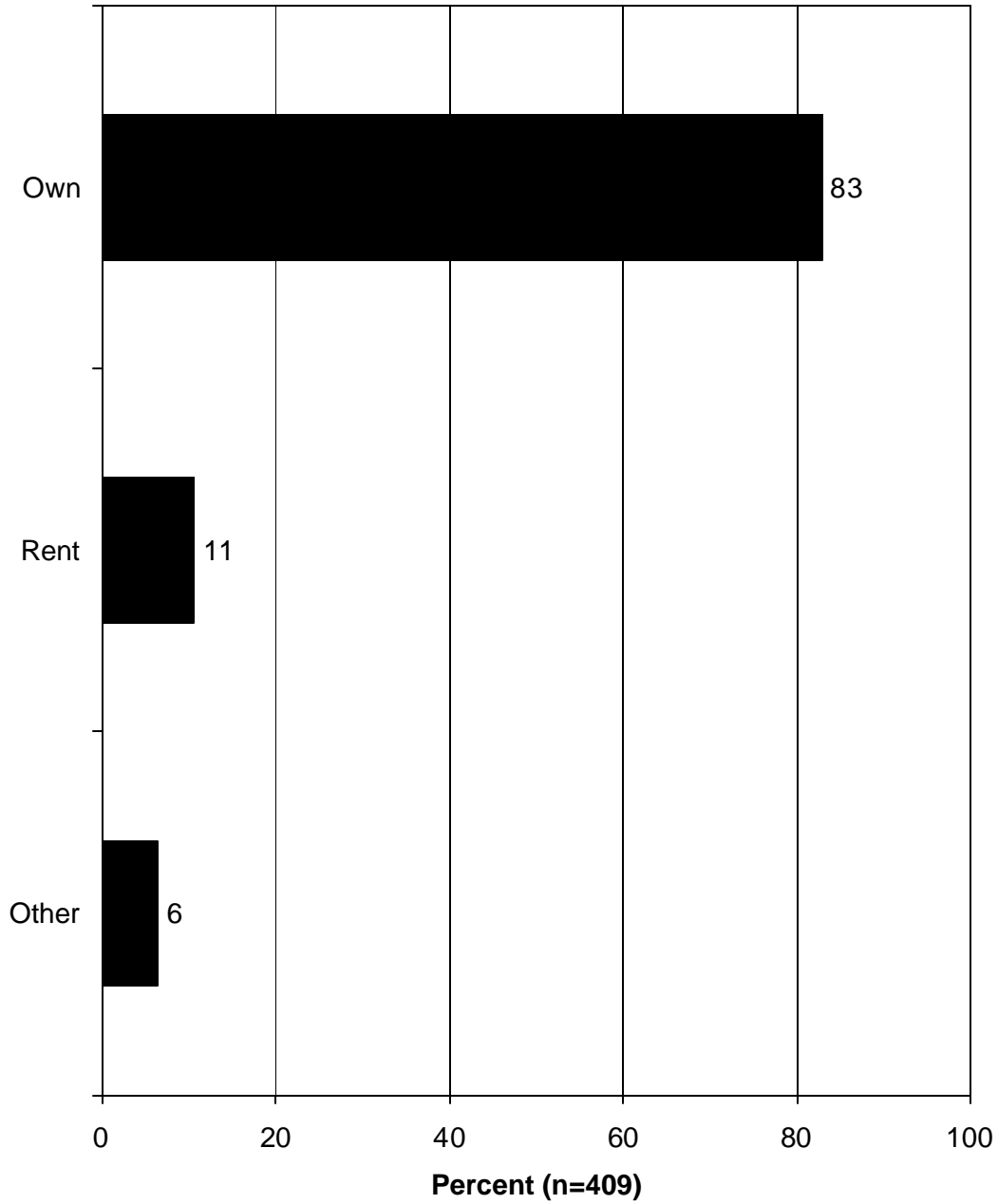
Q117. Are you part of a neighborhood association?



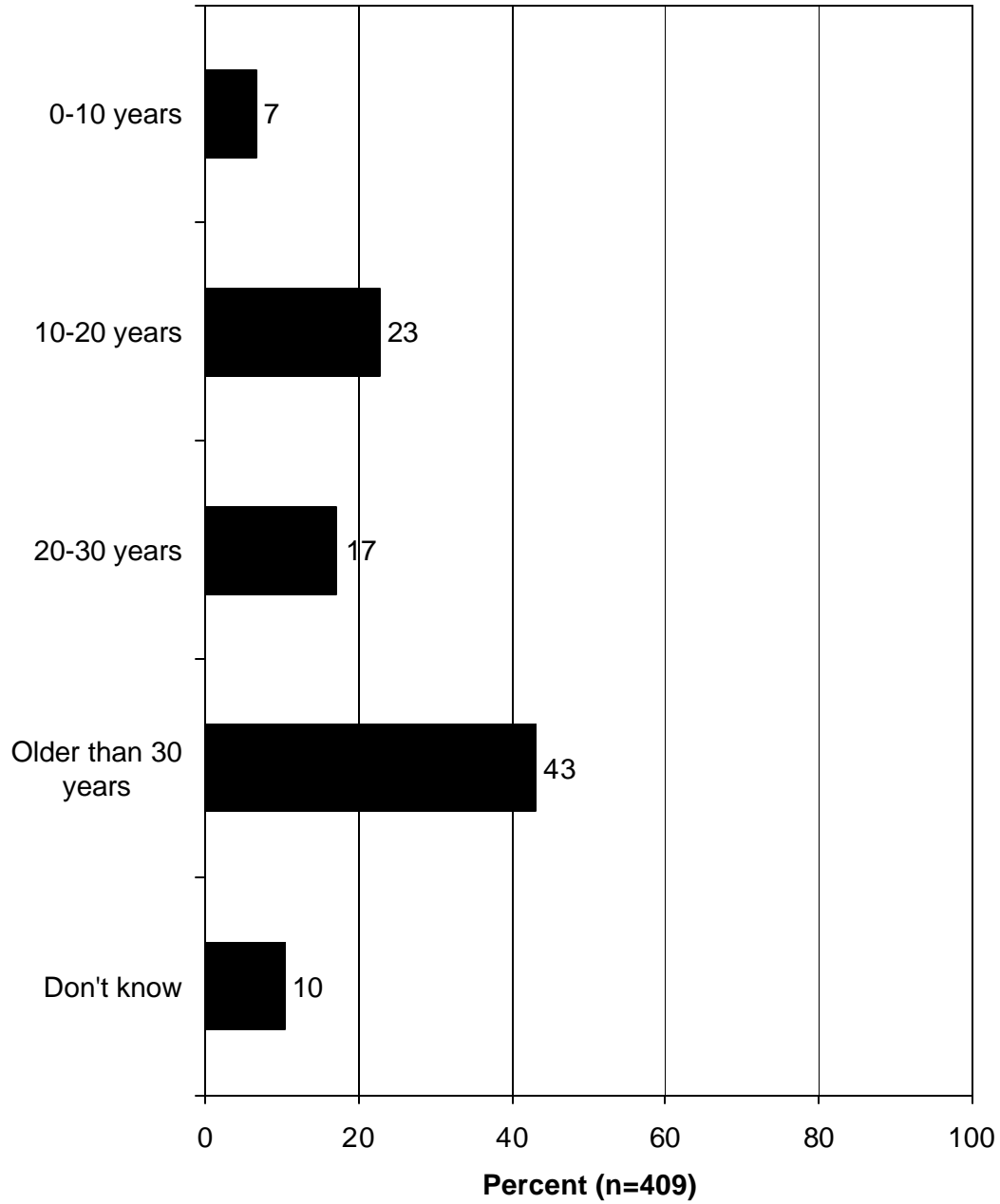
Q122. What type of housing do you live in?



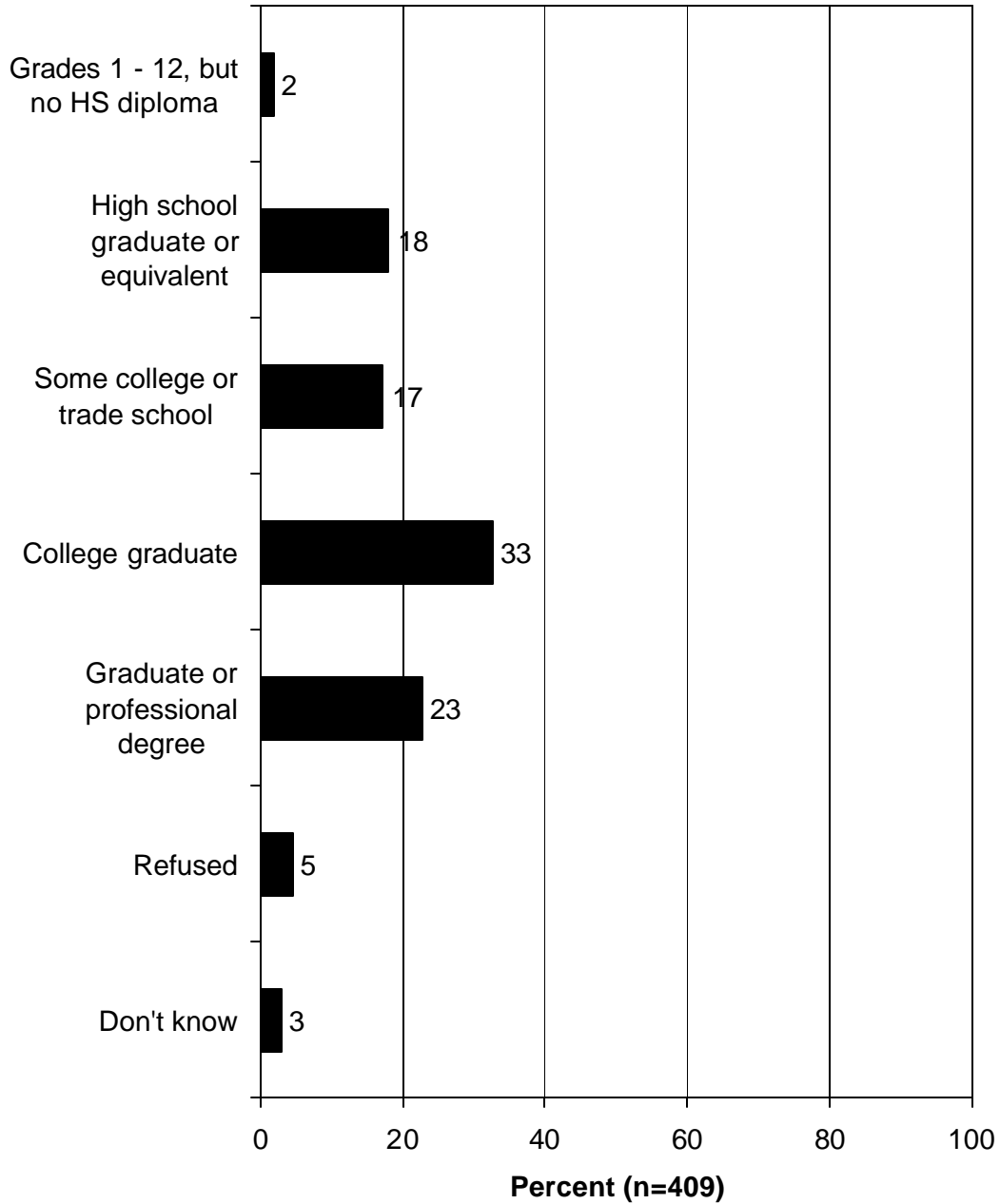
Q123. Do you own your home or do you rent?



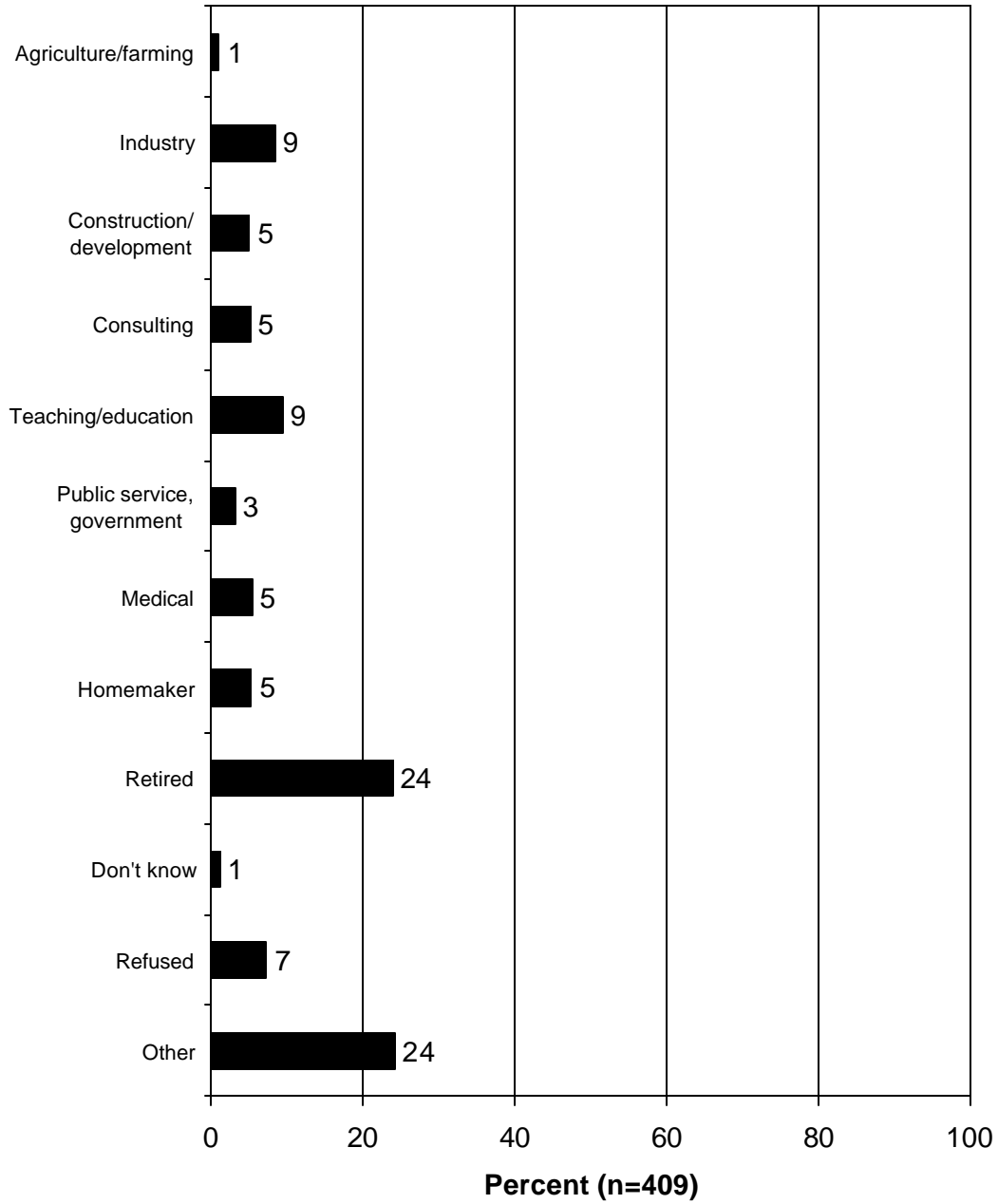
Q124. How old is your home?



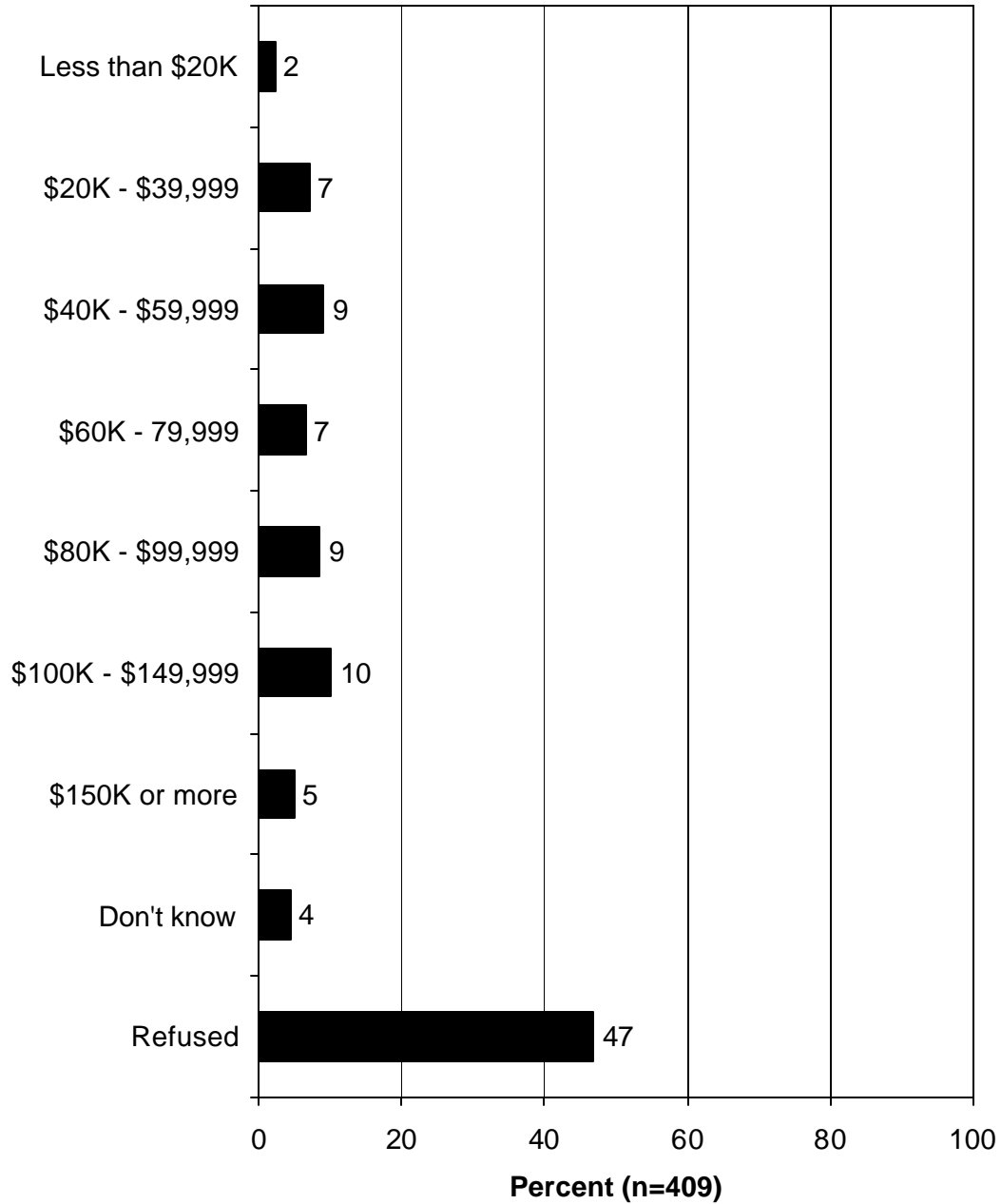
Q125. What is the highest grade level you have completed in school?



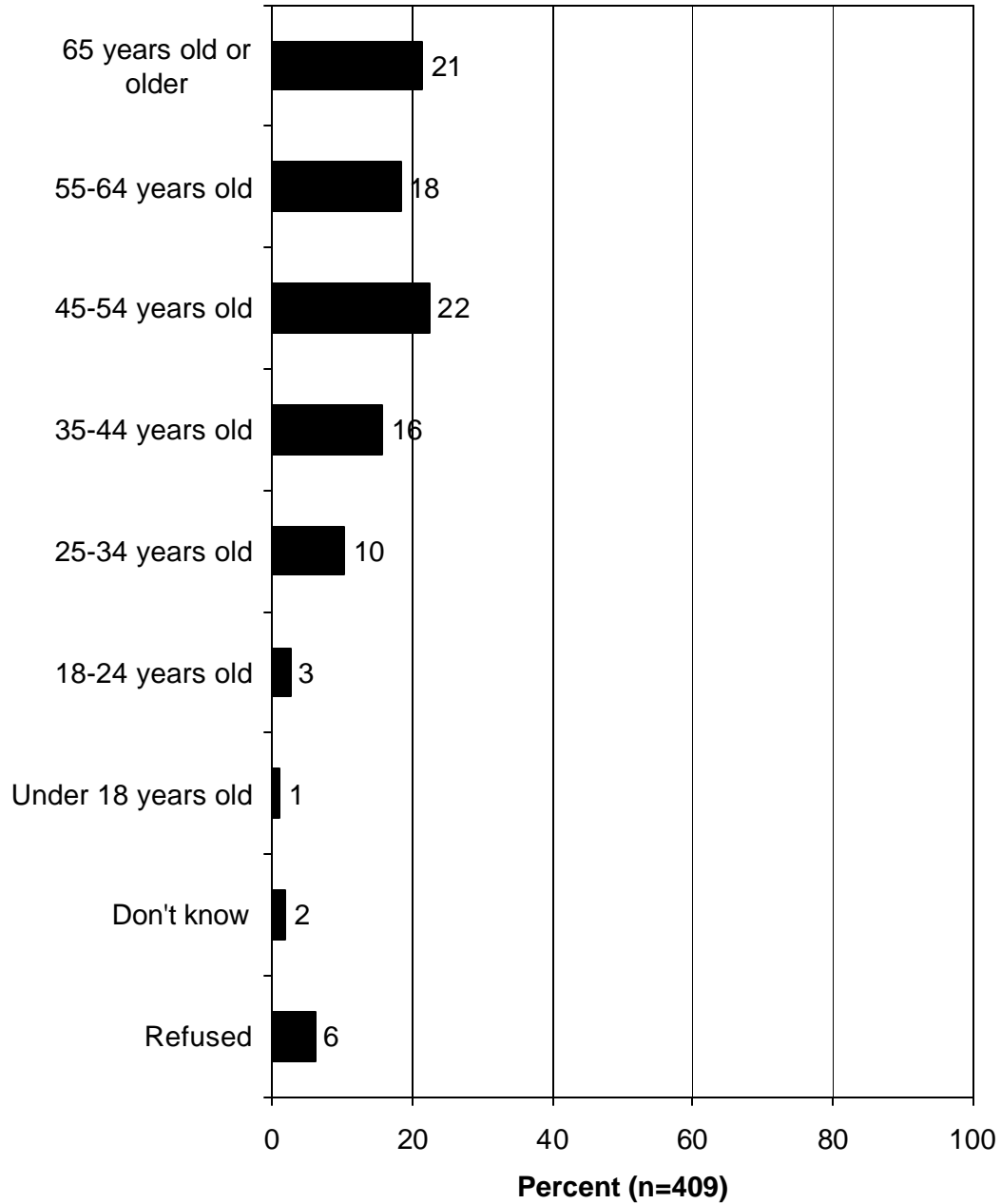
Q127. Which of these best describes your profession?



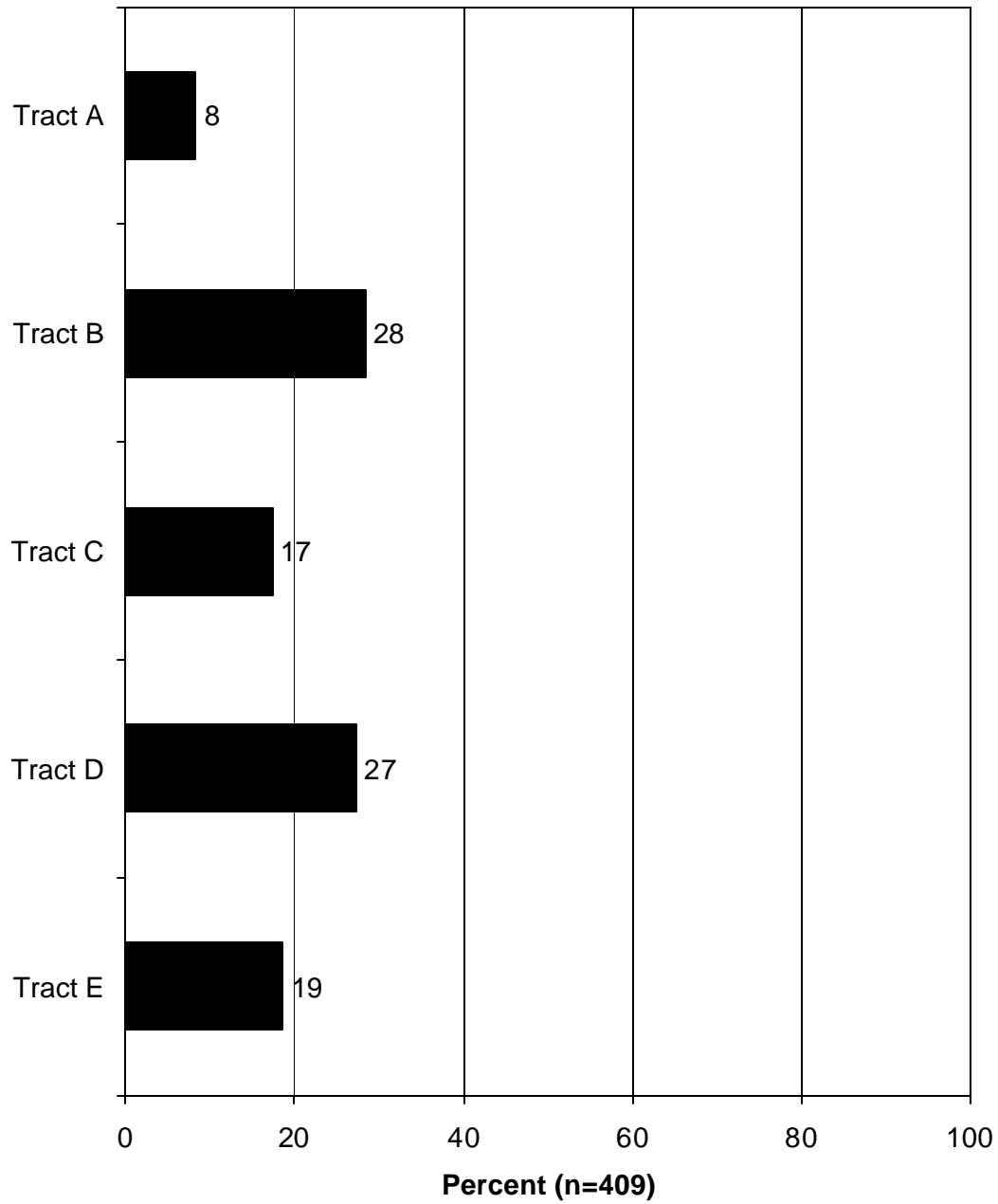
Q129. Which of these categories best describes your total household income before taxes last year?



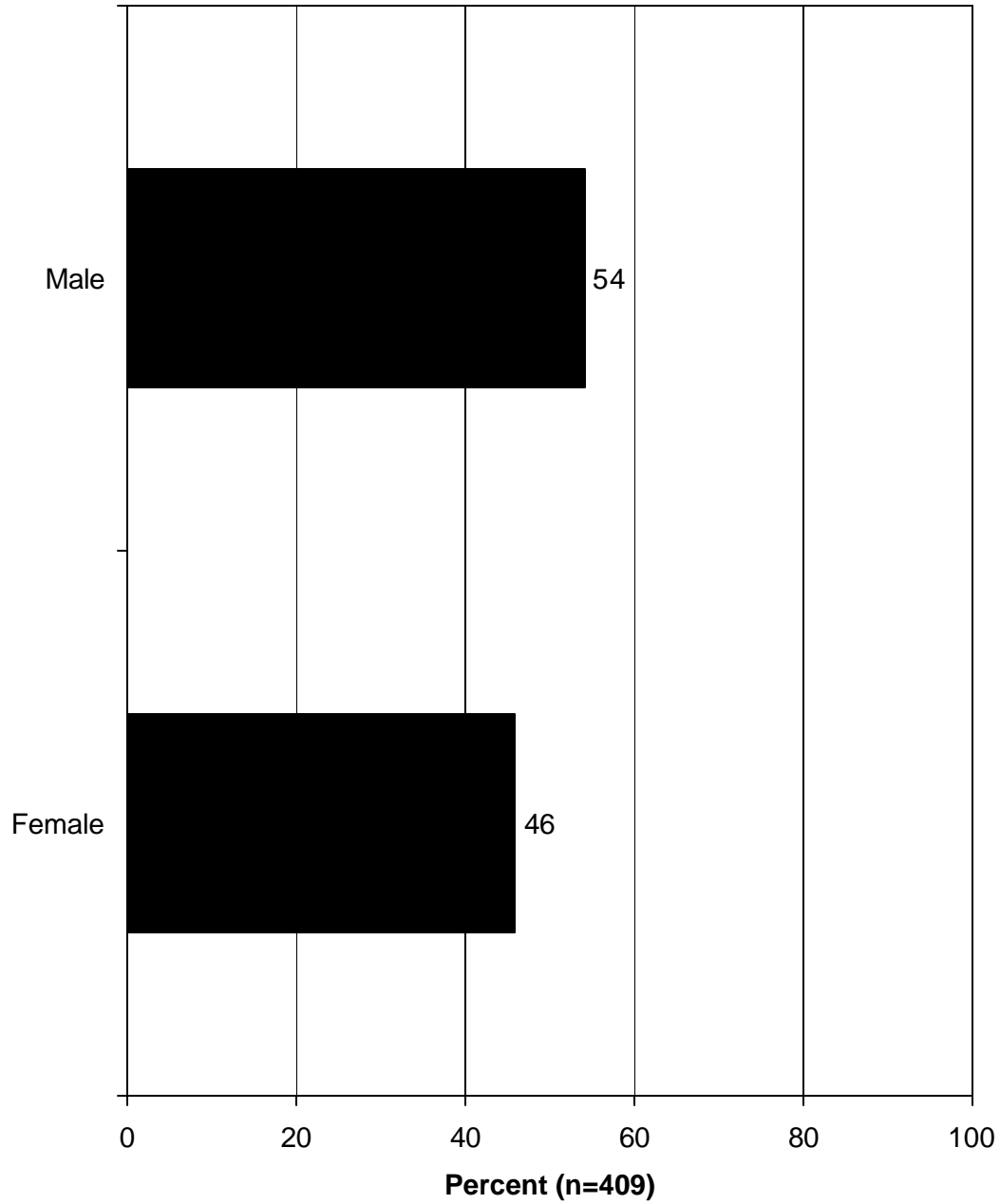
Q130. May I ask you your age?



Q132. Respondent's tract.



Q134. Respondent's gender (not asked, but observed by interviewer).

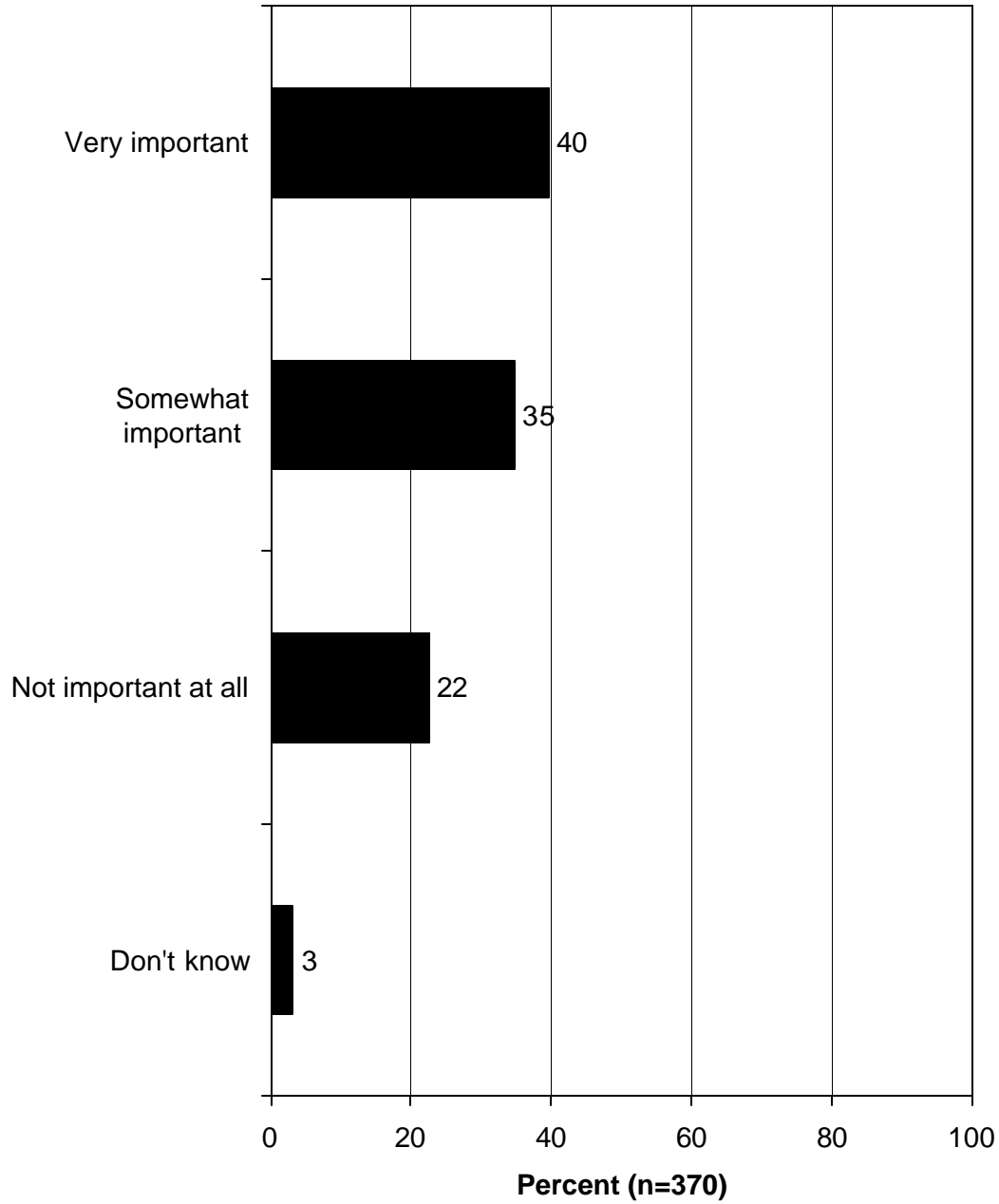


ADDITIONAL COMMENTS

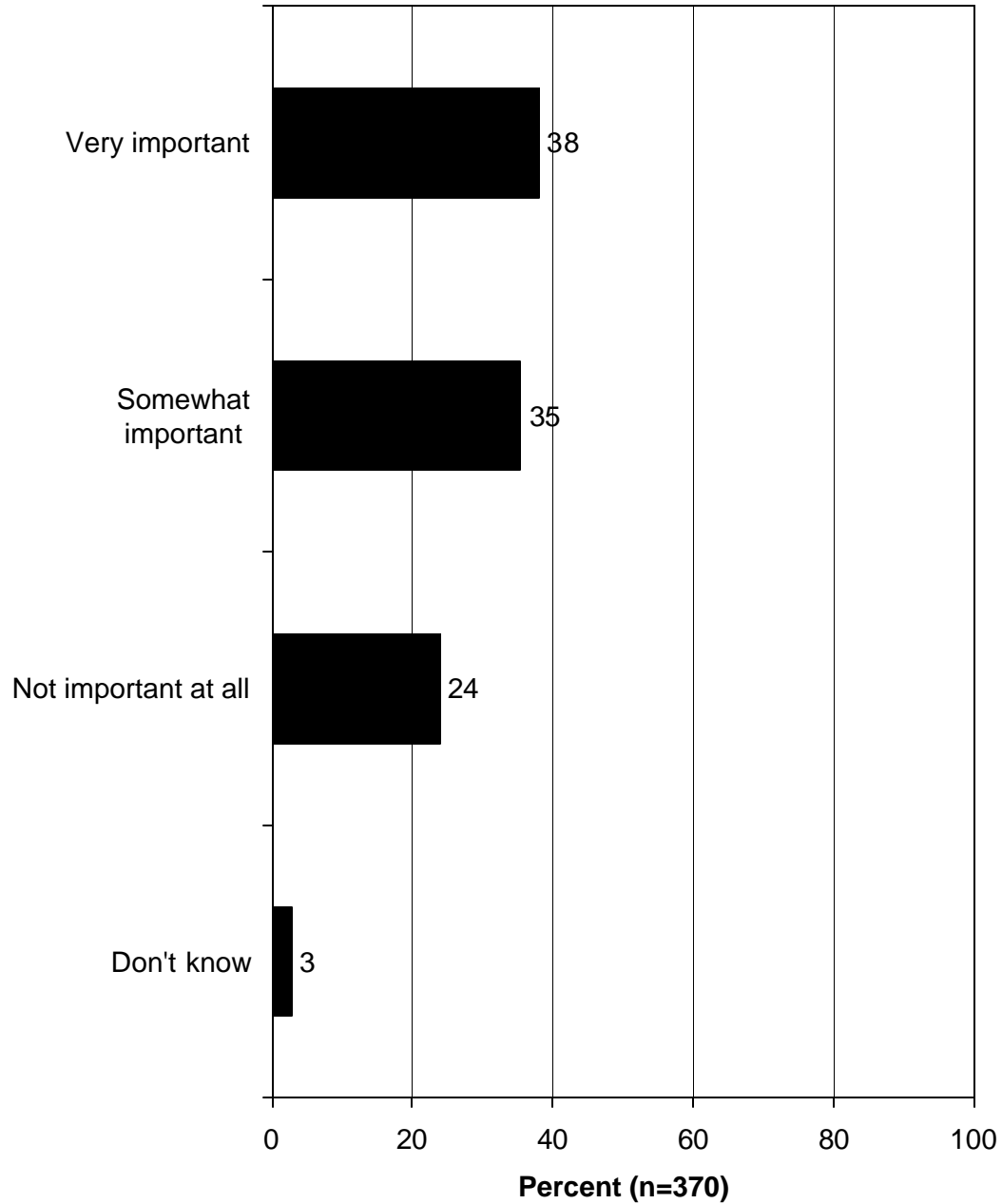
I am concerned about drinking water quality; it needs more testing.
DNREC or the EPA, whoever can better do it, needs to look into ways to improve the water quality and air quality as a whole in Delaware.
I want a sewage system in my neighborhood. It is good to make sure everyone in the southern county is taken care of by having the sewage system, and also all neighborhood septic systems should be eliminated in New Castle County.
There is a high cancer rate in our neighborhood, and I think this is from pollutants. I would like to see better drinking water also; quality is very poor.
I'm satisfied with the water in my area.
There was a blocked up storm drain for 2 years.
I am very glad that the government has acknowledged the fact that something needs to be done with regard to water quality. If ever I am needed to provide information again or help with anything, feel free to get in contact with me.
I hope that something comes of this survey because we have some critical issues in Delaware that need to be addressed.
I think that water resources should be taken better care of. I'm glad to see that something is finally being done.
The water tastes terrible; we have terrible water pressure. We don't like the water, and we don't get enough of it.
I live near the PA border, and development in PA has contributed to flooding in our neighborhood streams. The head of FEMA was here and told us that when they were doing developing in close by PA, proper measures were not taken to prevent flooding.
I am all for anything that helps out the environment.
Please keep the people informed!
I never knew that grass clippings in drainage areas could affect the water quality; glad that I now know that.
Water problems for us: Contaminated well water (lead and copper). I would like to see treated water come to your area (good quality).
I support all of the water runoff management measures as long as something is done along with it to control mosquitoes that are attracted to the stagnant water.
I think it is very useful to do this survey.
Overall I think DNREC does a good job. I think the county needs to do a better job at developments to prevent runoff from occurring.
I just hope you people are taking care of our streams. I'm really glad to have all the places along the stream banks for biking, etc., and outdoor recreation.
I think there should be a place where things like grass, leaves, clippings can be dumped to work as a natural compost or resources for animals. I think if that and also things like rain barrels were advertised more, people would use them.
I would like to have a grass and leaves pickup system in my area.
I am in favor of doing anything to improve water quality.
My great hope is that the government will stop trying to help me.
The water is terrible!

ADDITIONAL GRAPHS

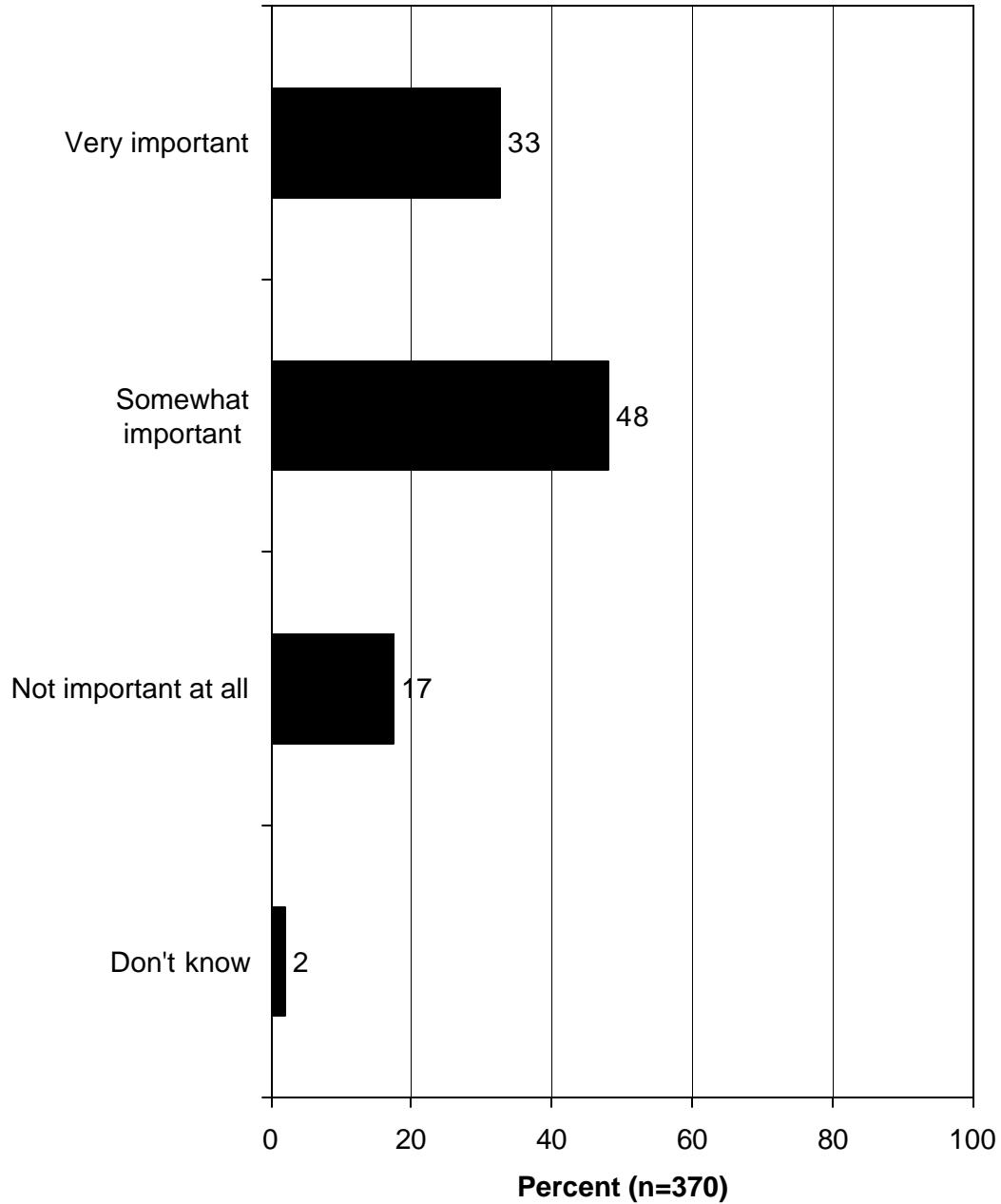
Q22. Is the degree of difficulty very important, somewhat important, or not important at all, when planning yard care maintenance? (Asked of those who have a yard.)



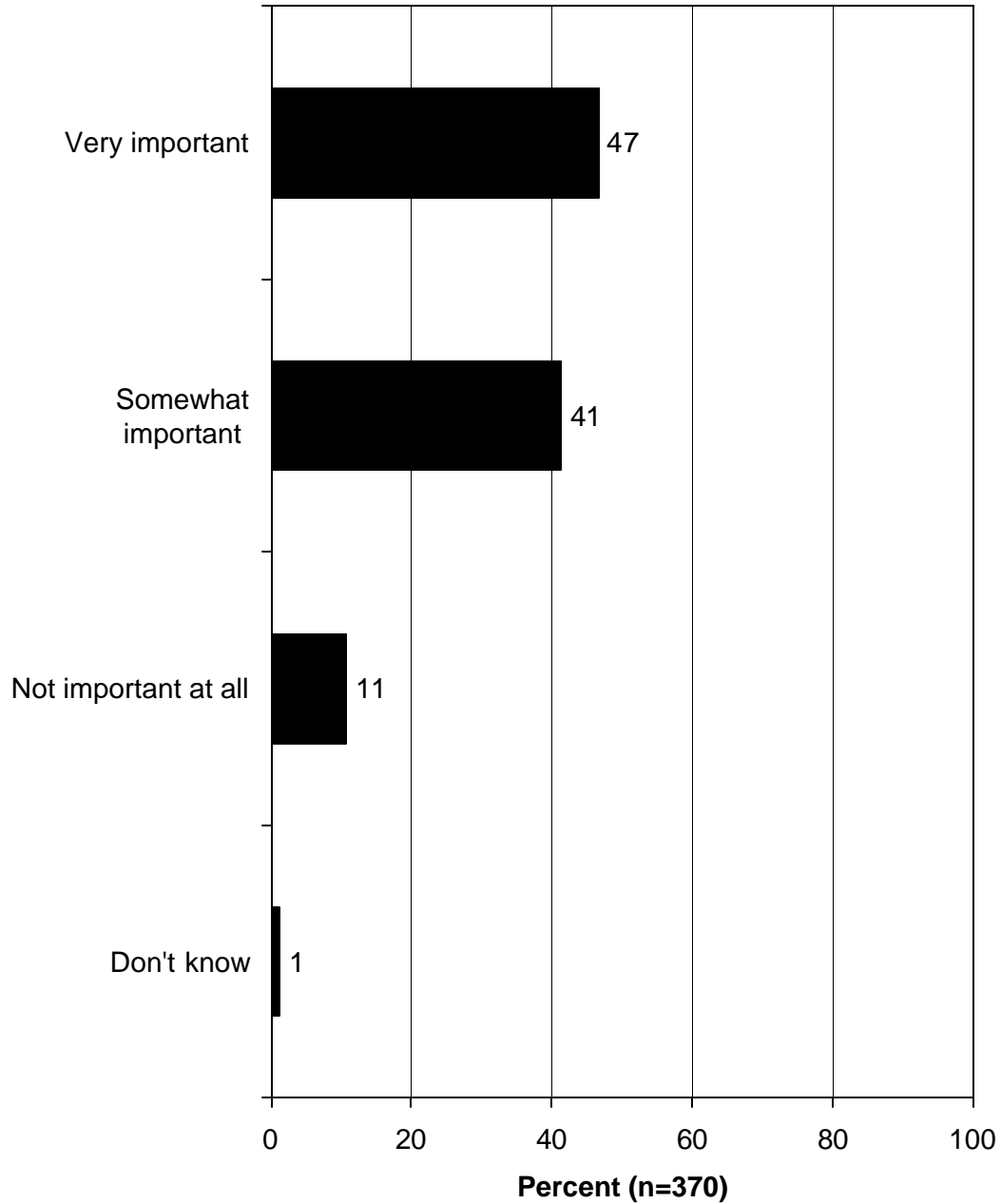
Q23. Is the time involved very important, somewhat important, or not important at all, when planning yard care maintenance? (Asked of those who have a yard.)



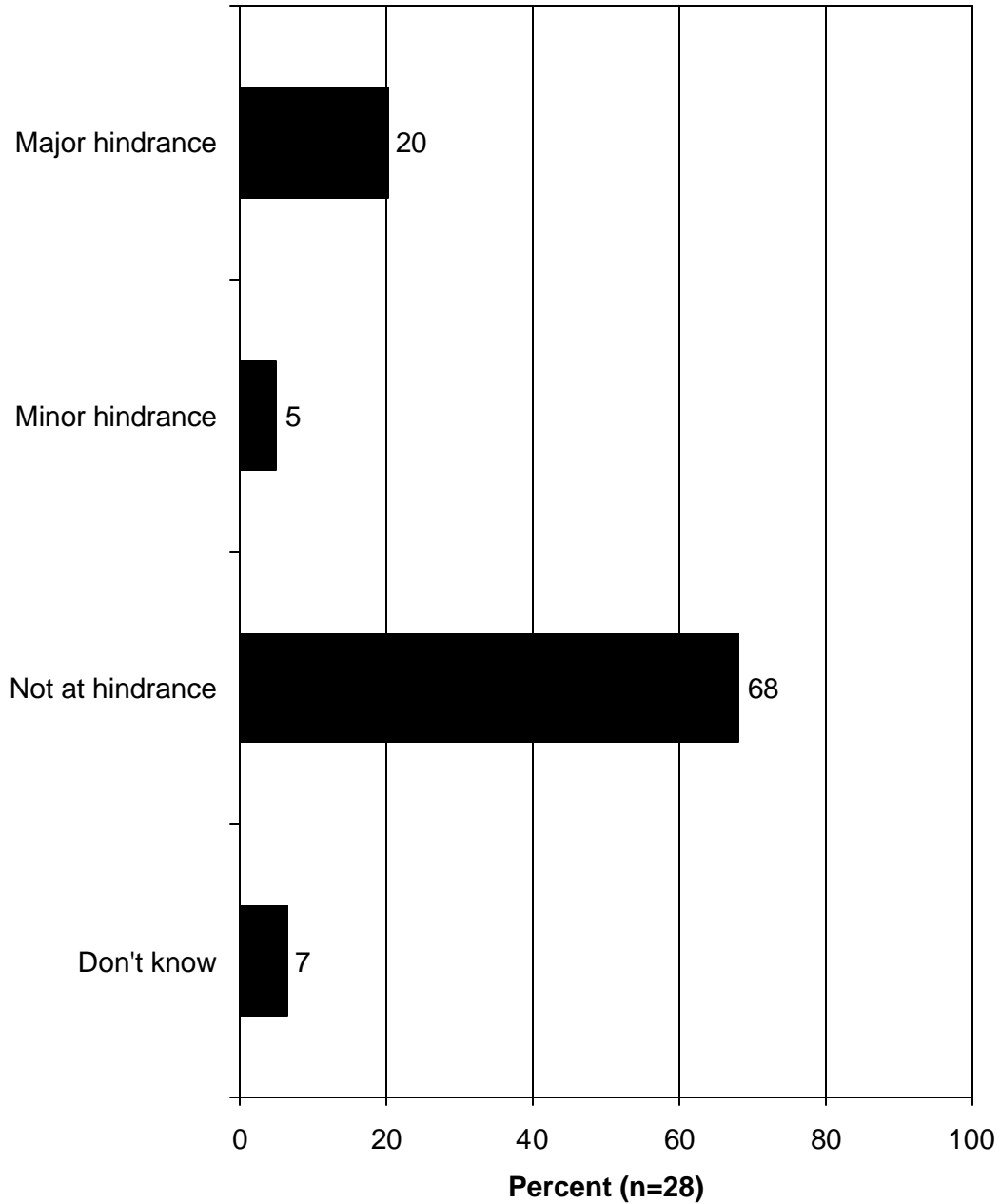
Q24. Is the cost involved very important, somewhat important, or not important at all, when planning yard care maintenance? (Asked of those who have a yard.)



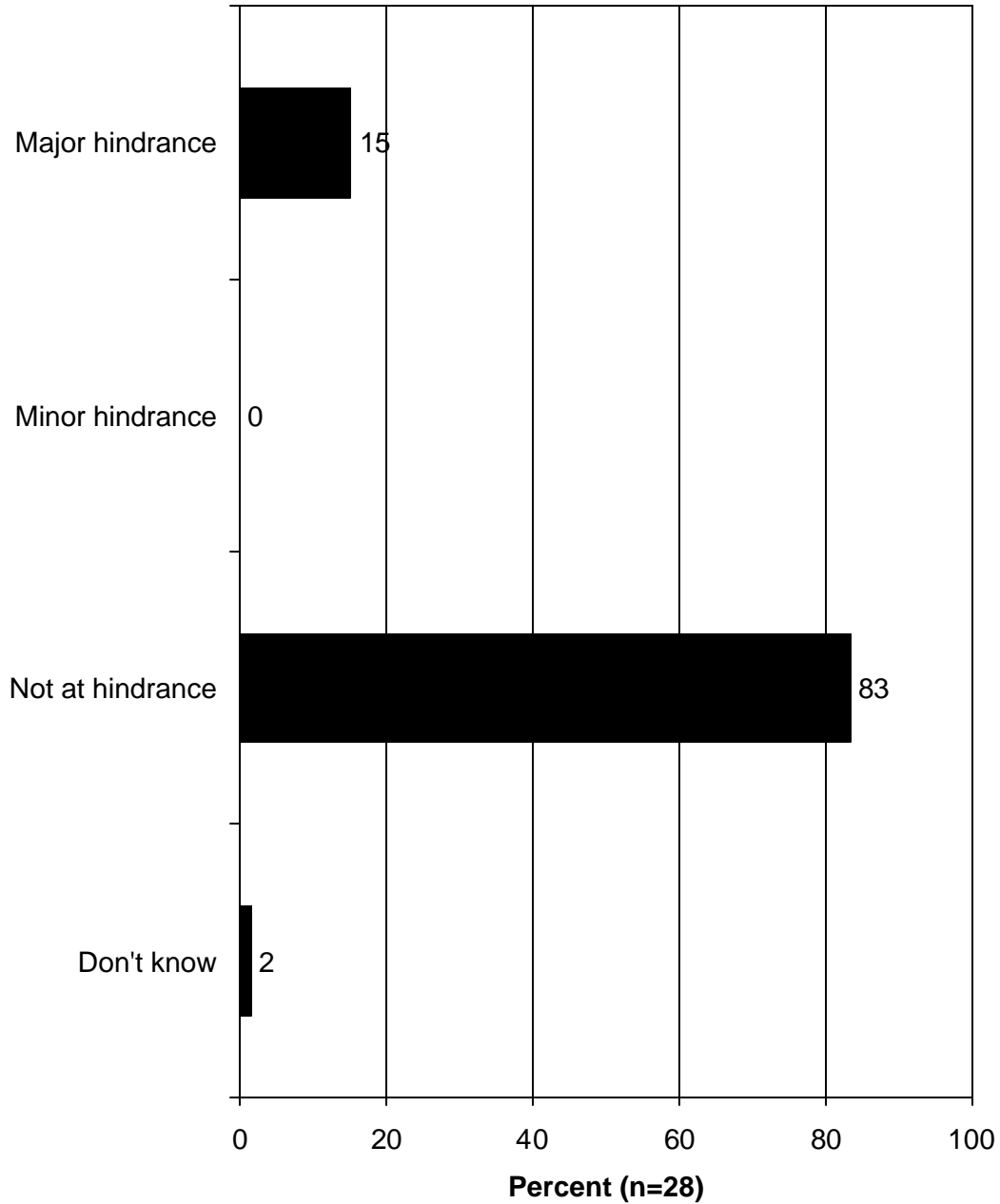
Q25. Is a highly groomed appearance very important, somewhat important, or not important at all, when planning yard care maintenance? (Asked of those who have a yard.)



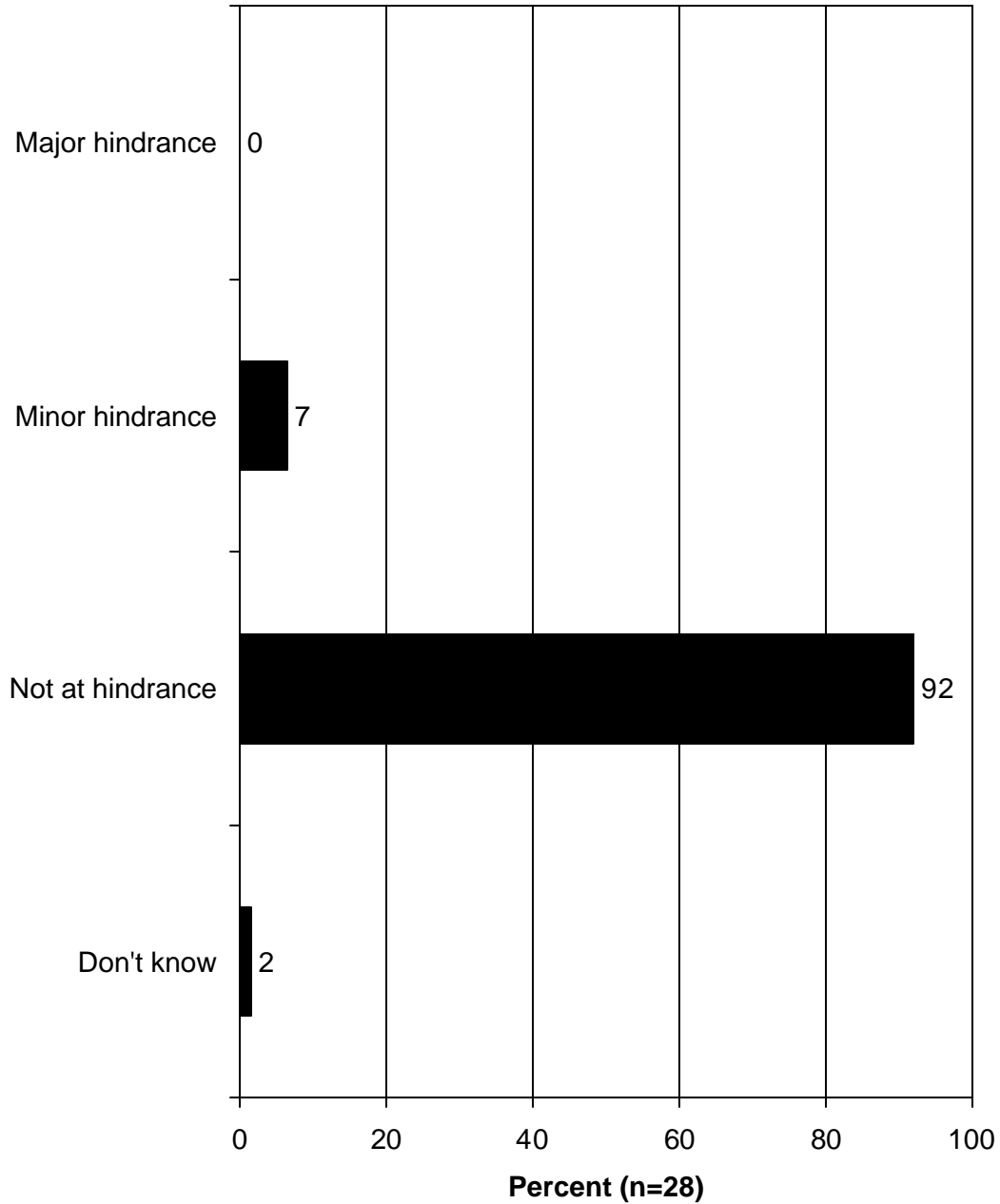
Q56. Is blocking the stream view a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



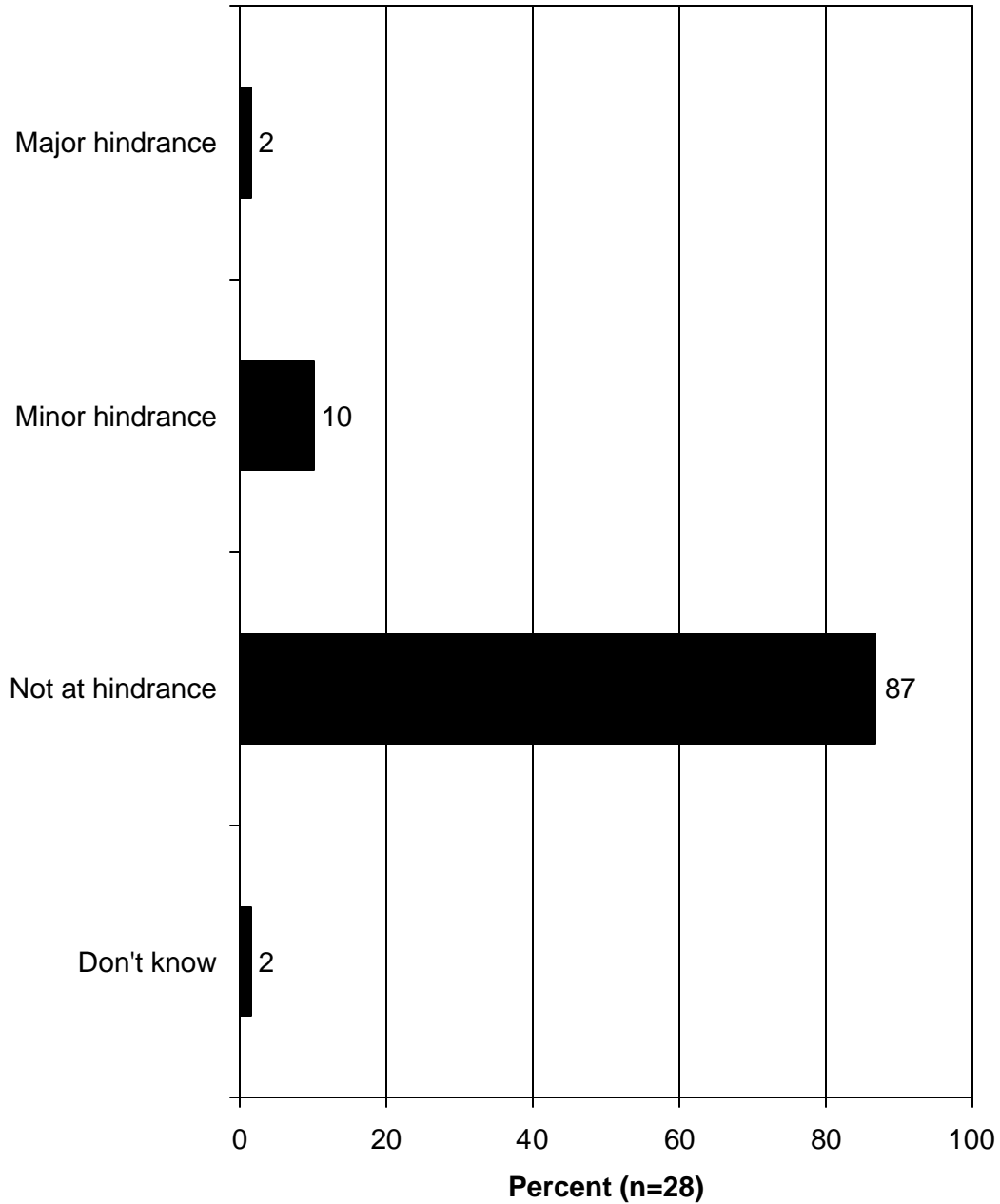
Q57. Is having to rake leaves a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



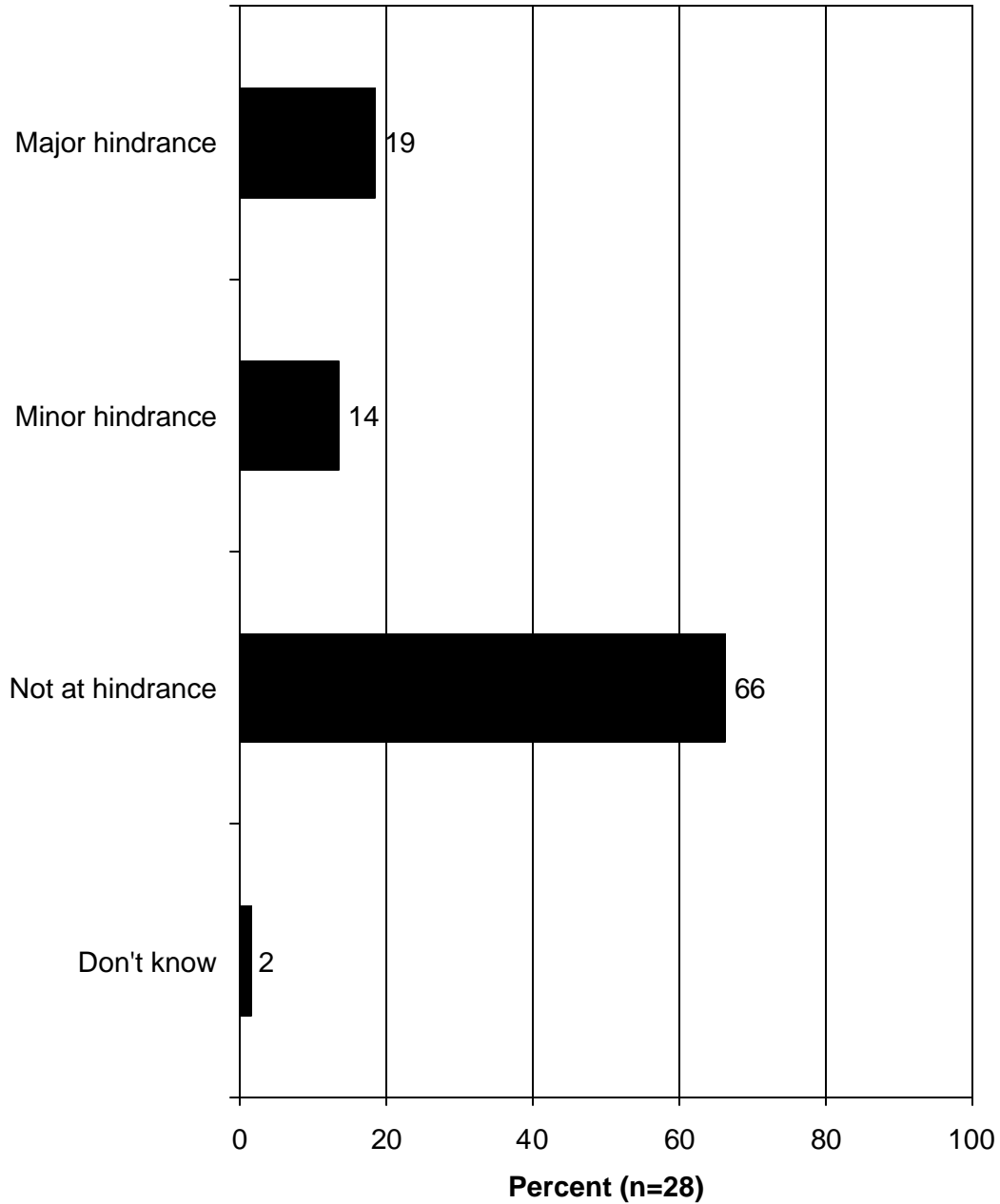
Q58. Is not knowing how to choose plants a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



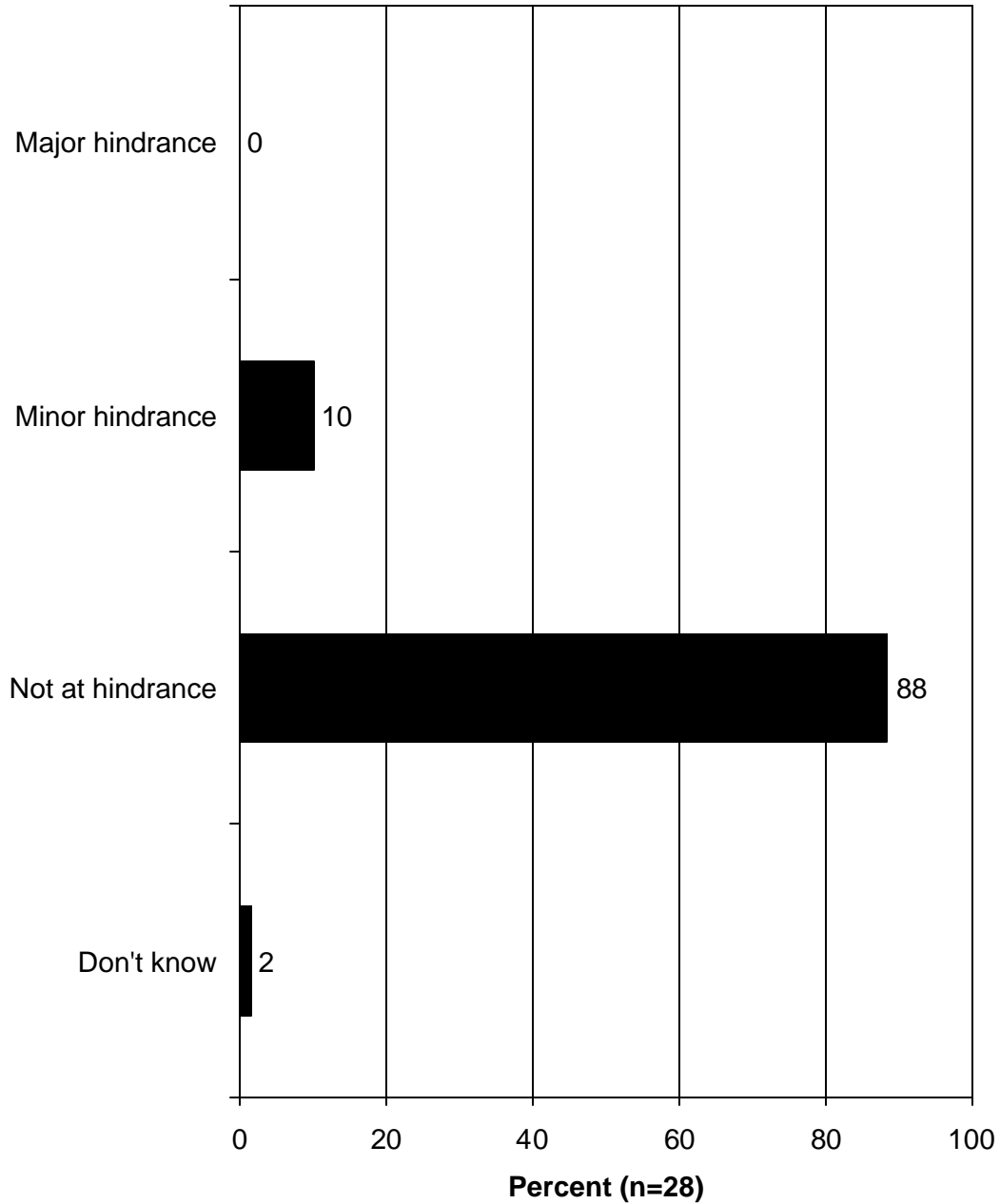
Q59. Is not knowing how to maintain plantings a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



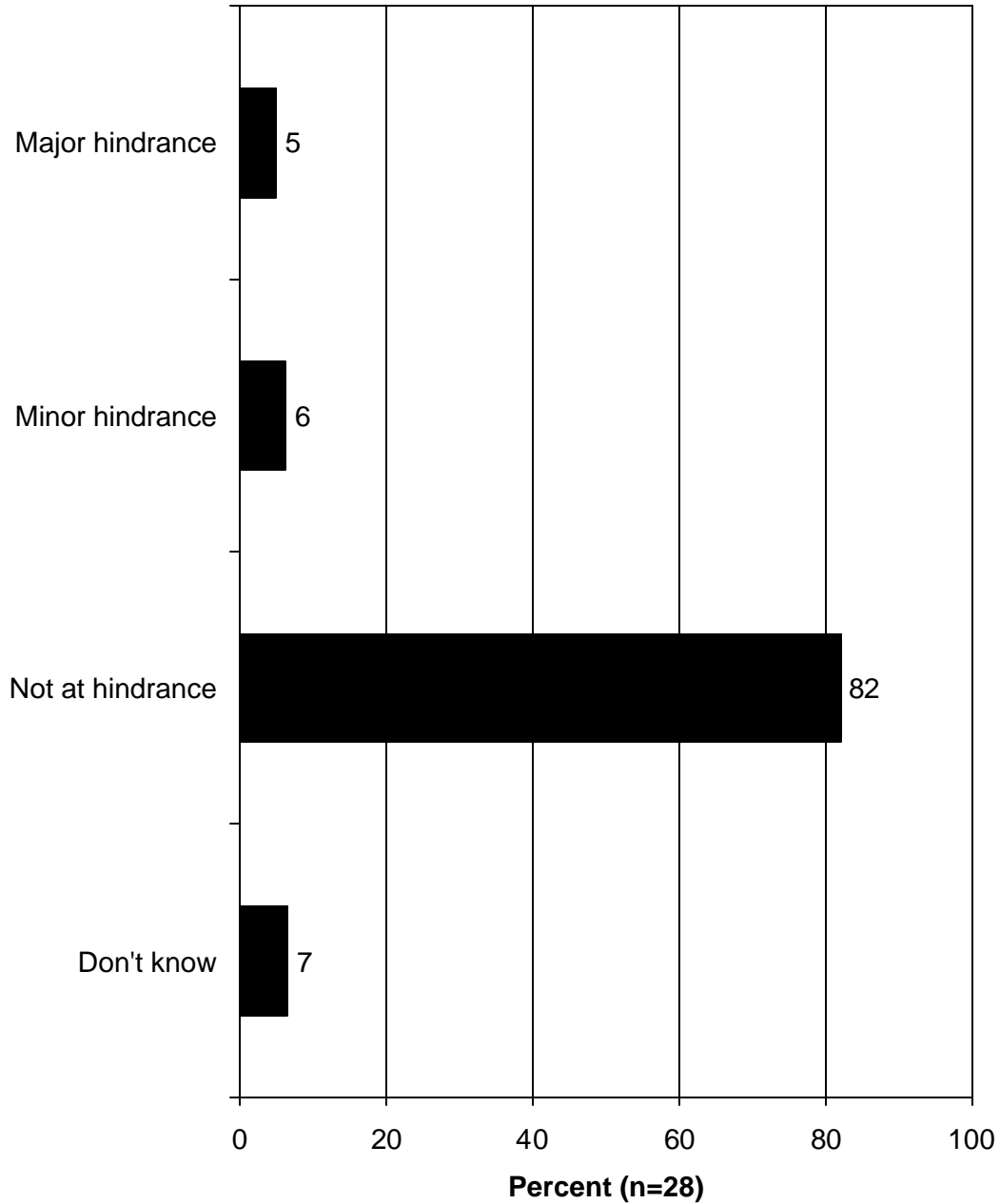
Q60. Is the cost a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



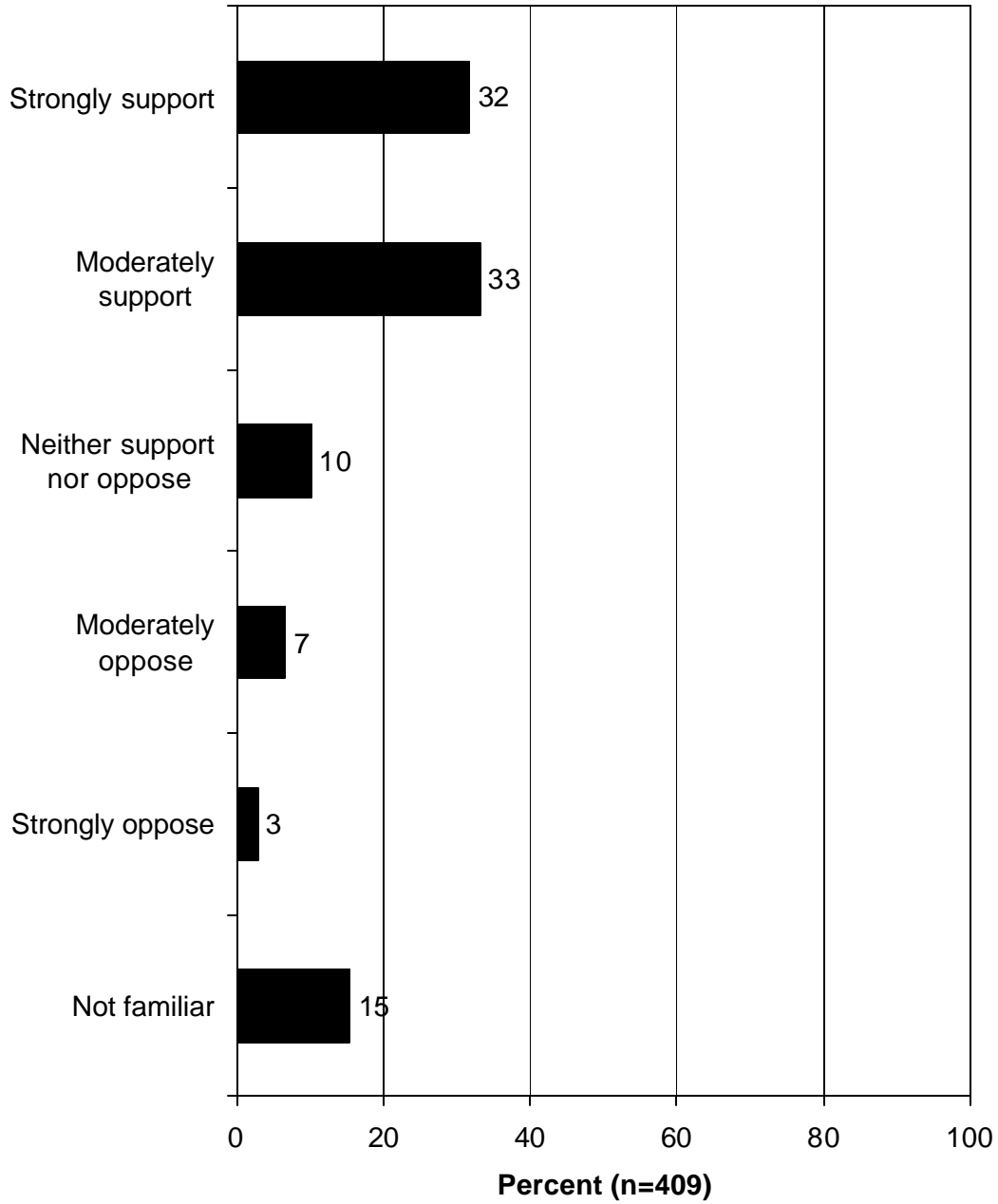
Q61. Is not knowing where to get plants a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



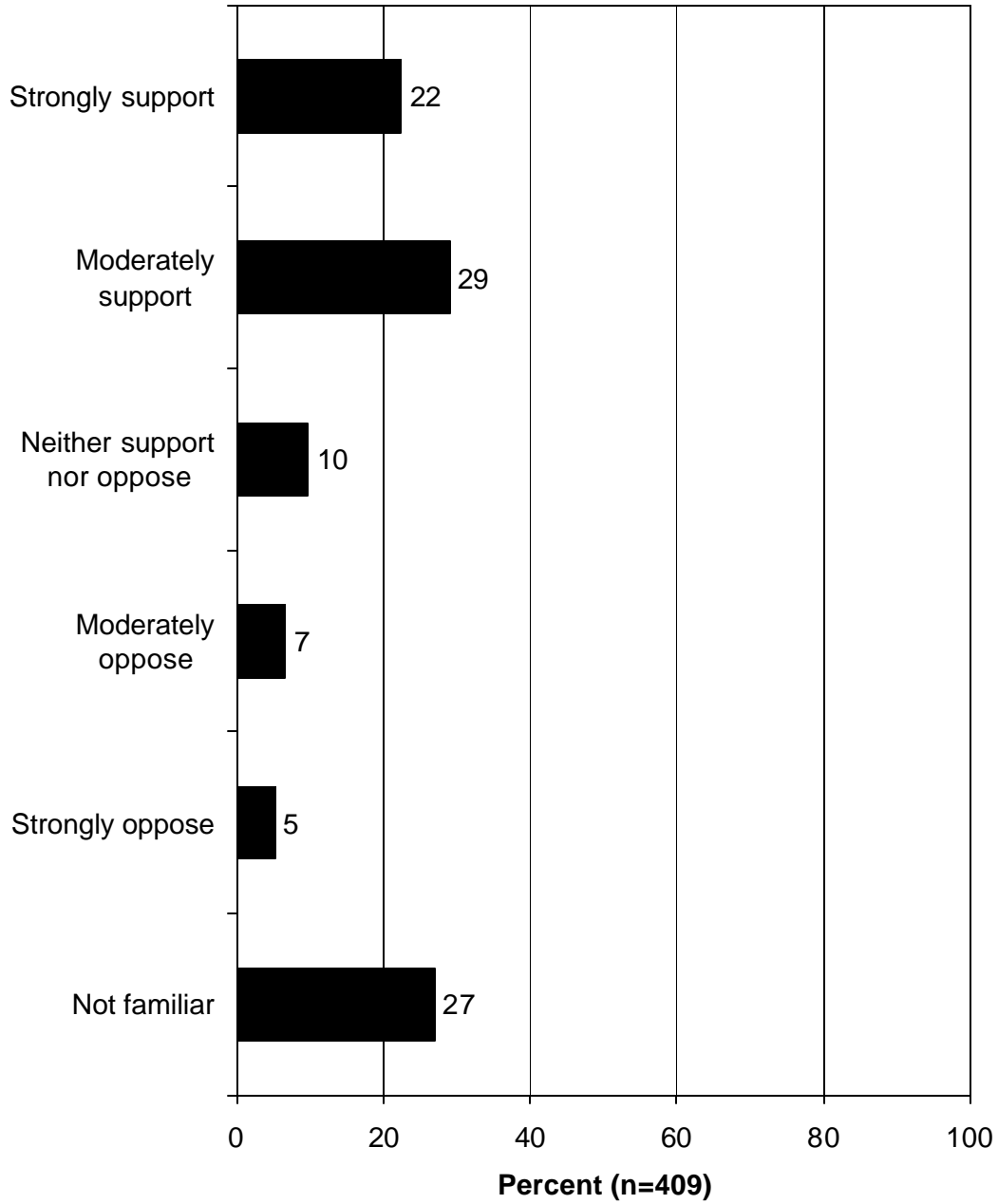
Q62. Is too much shade a hindrance to planting borders along a stream bank? (Asked of those who have a stream on their property.)



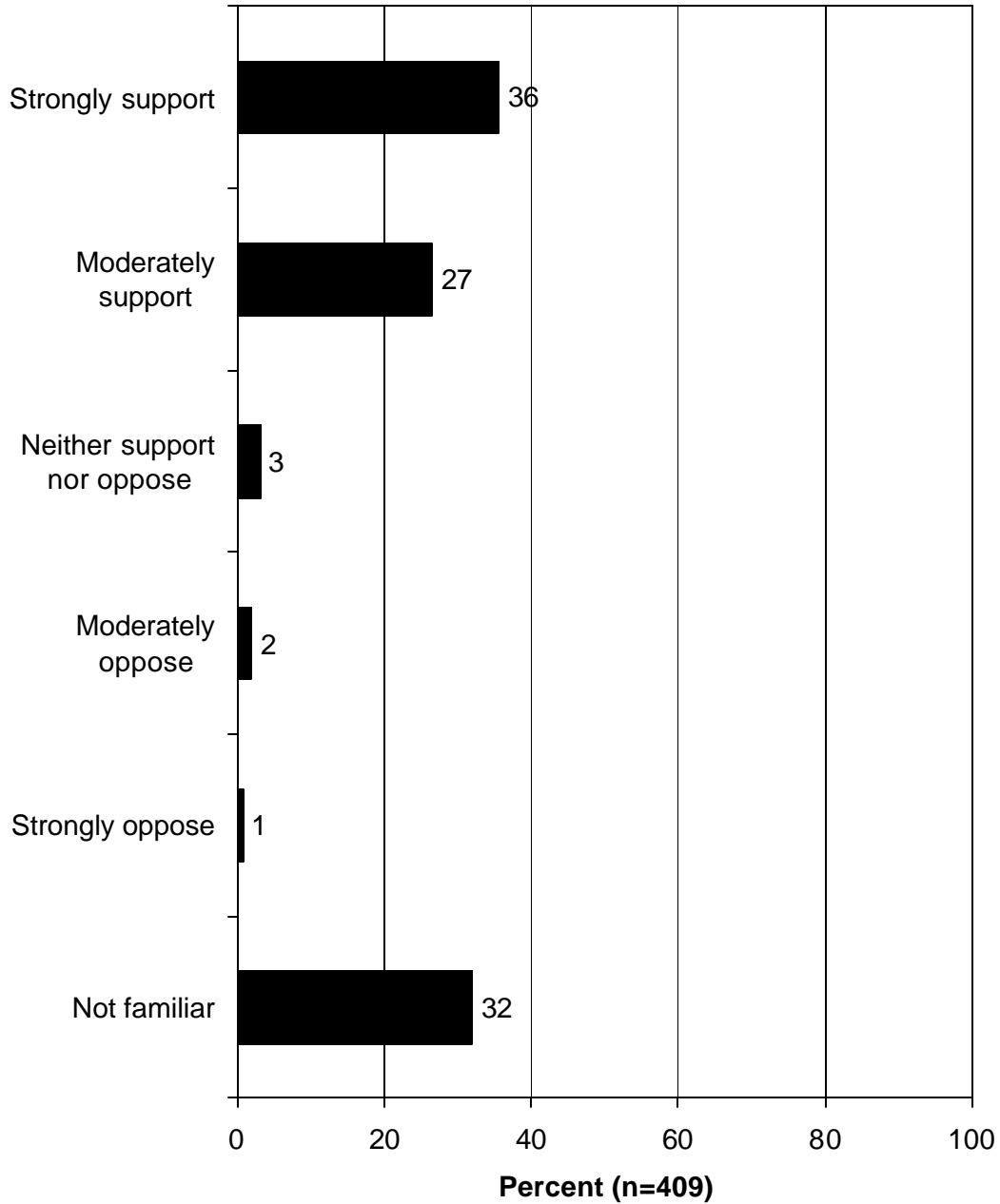
Q72. Do you support or oppose limiting paved areas?



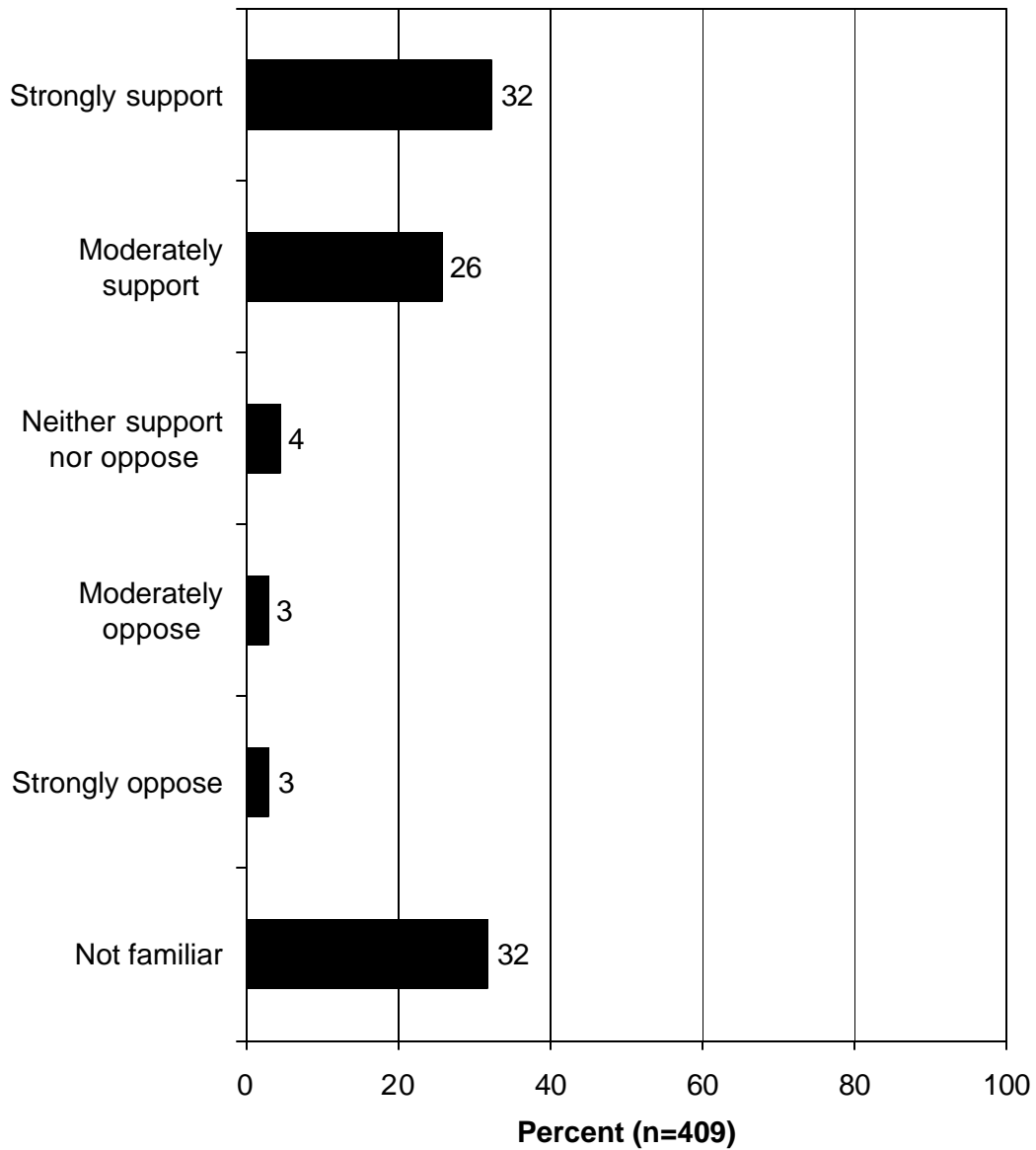
Q73. Do you support or oppose rain barrels?



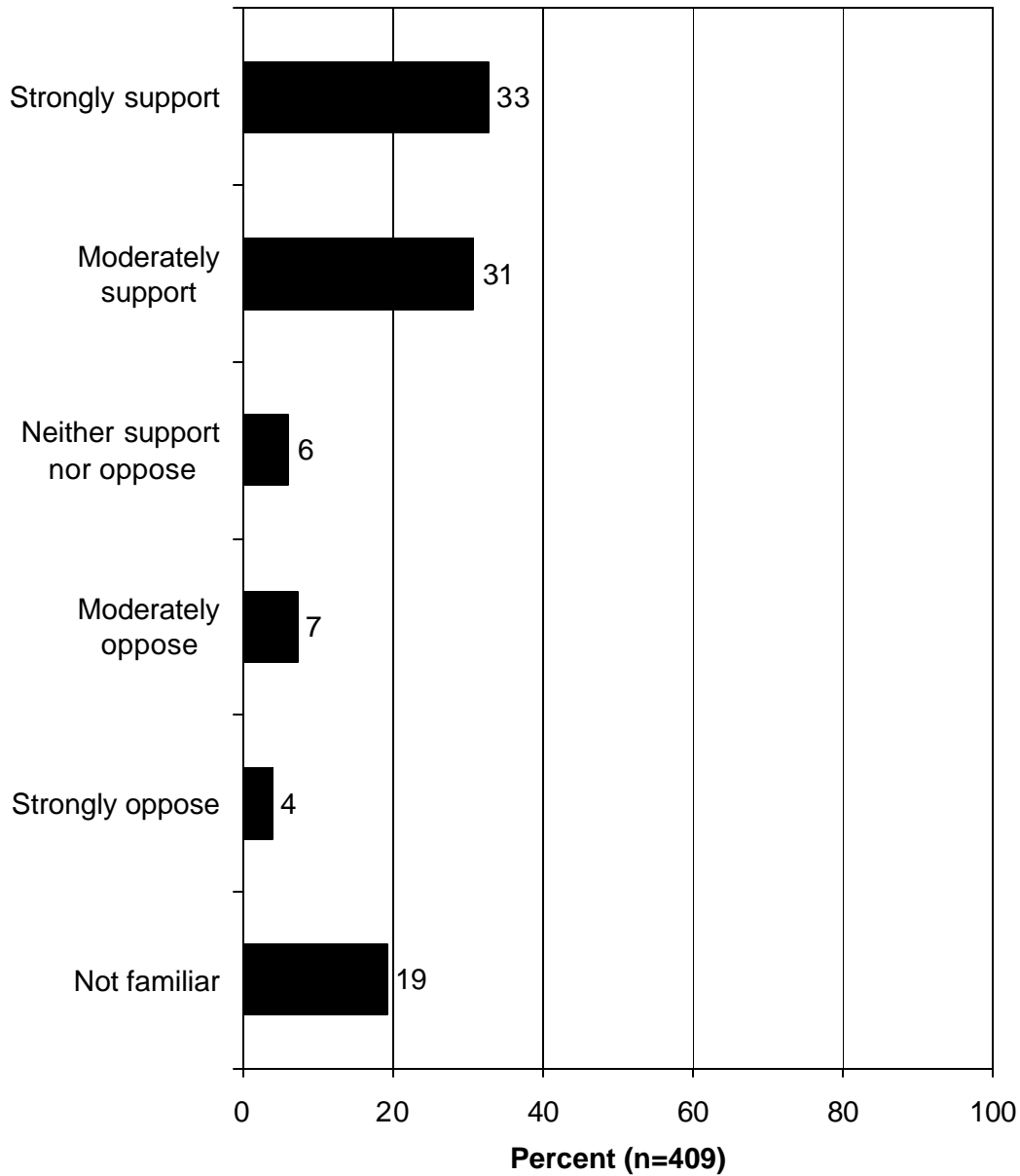
Q74. Do you support or oppose rain gardens (a natural area planted with specific types of vegetation to allow rain and snowmelt to seep naturally into the ground)?



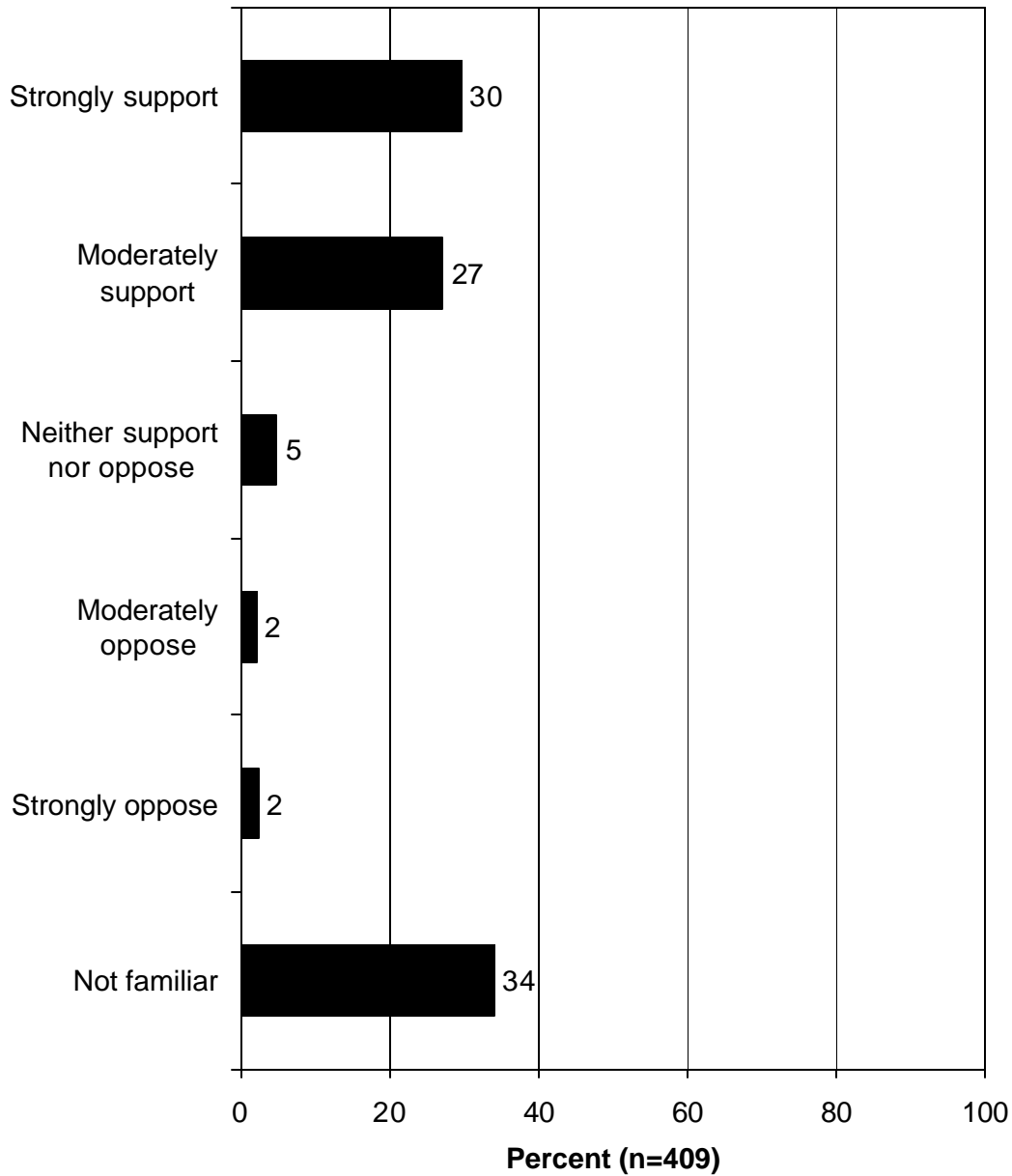
Q75. Do you support or oppose catch basin inserts (a simple device designed to fit most catch basins; held in place by the metal grate, it effectively removes coarse sediments, oil, grease, litter and debris from storm water runoff)?



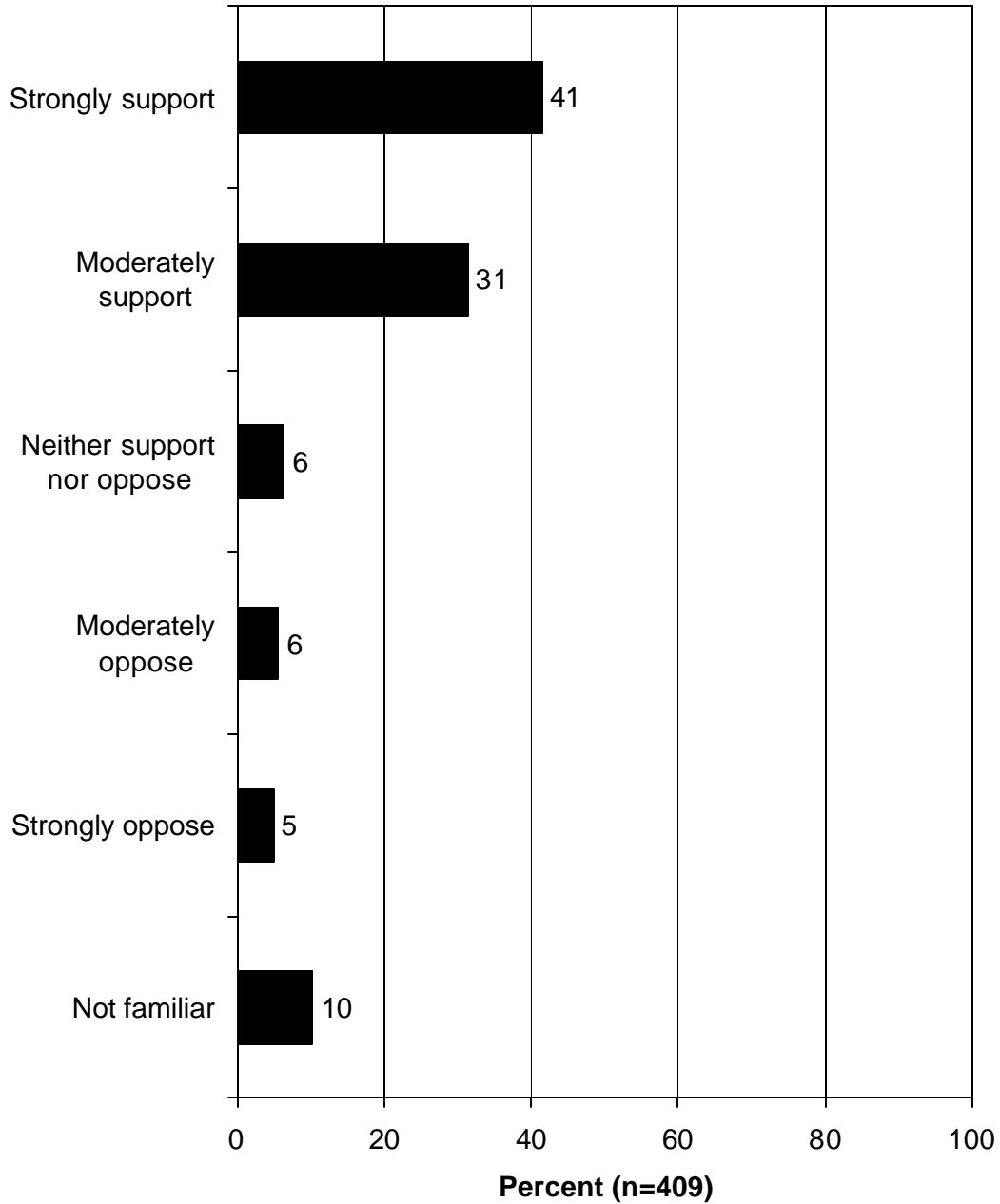
Q76. Do you support or oppose stormwater ponds/basins (a structure designed to intercept runoff from developed areas allowing many pollutants to settle out, mimicking the natural runoff rate before development)?



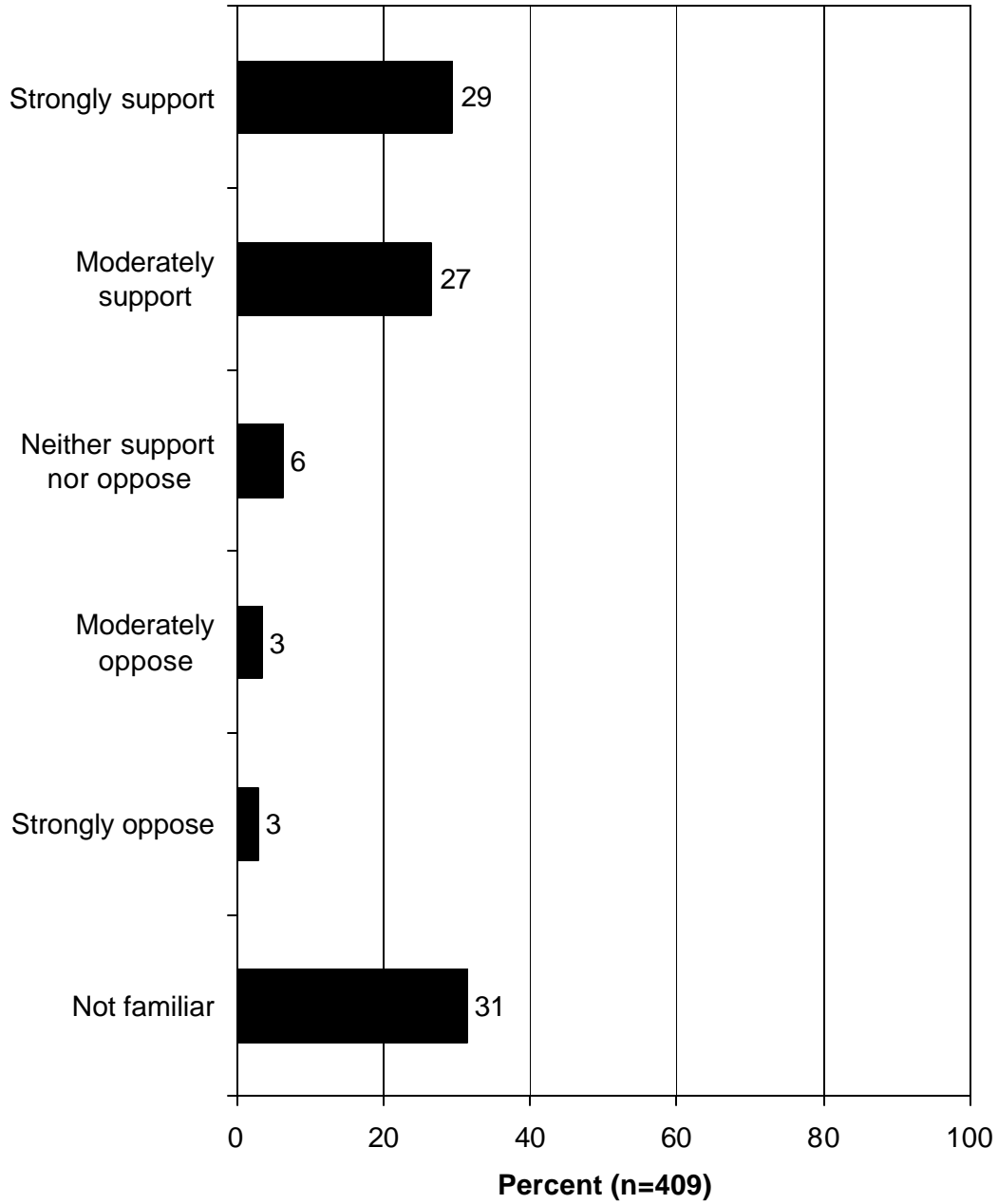
Q77. Do you support or oppose bioswales (a depression in the ground with sloping sides that catches rainwater; the ponding helps slow the flow rate of water and allows pollutants to settle out of the water)?



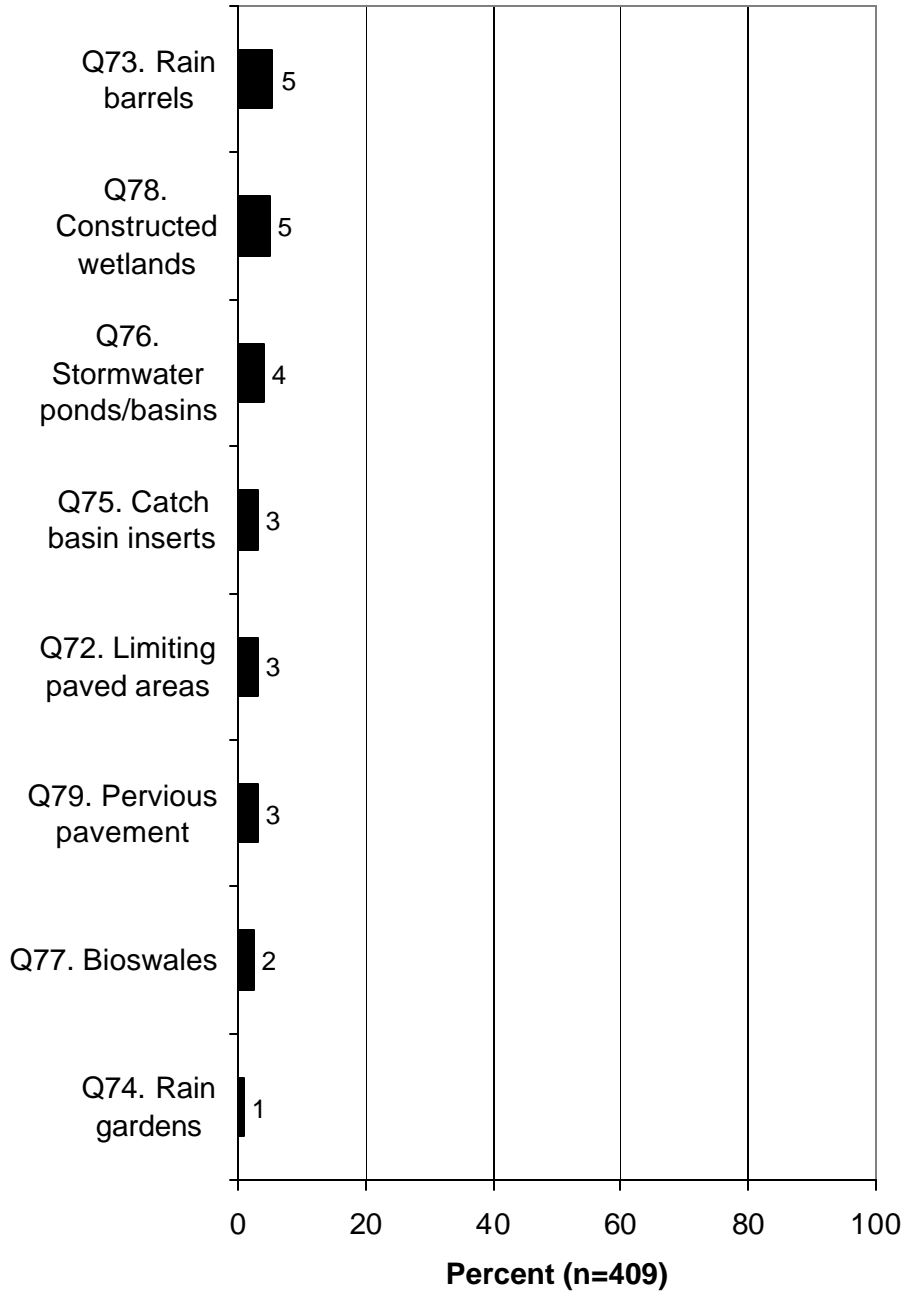
Q78. Do you support or oppose constructed wetlands?



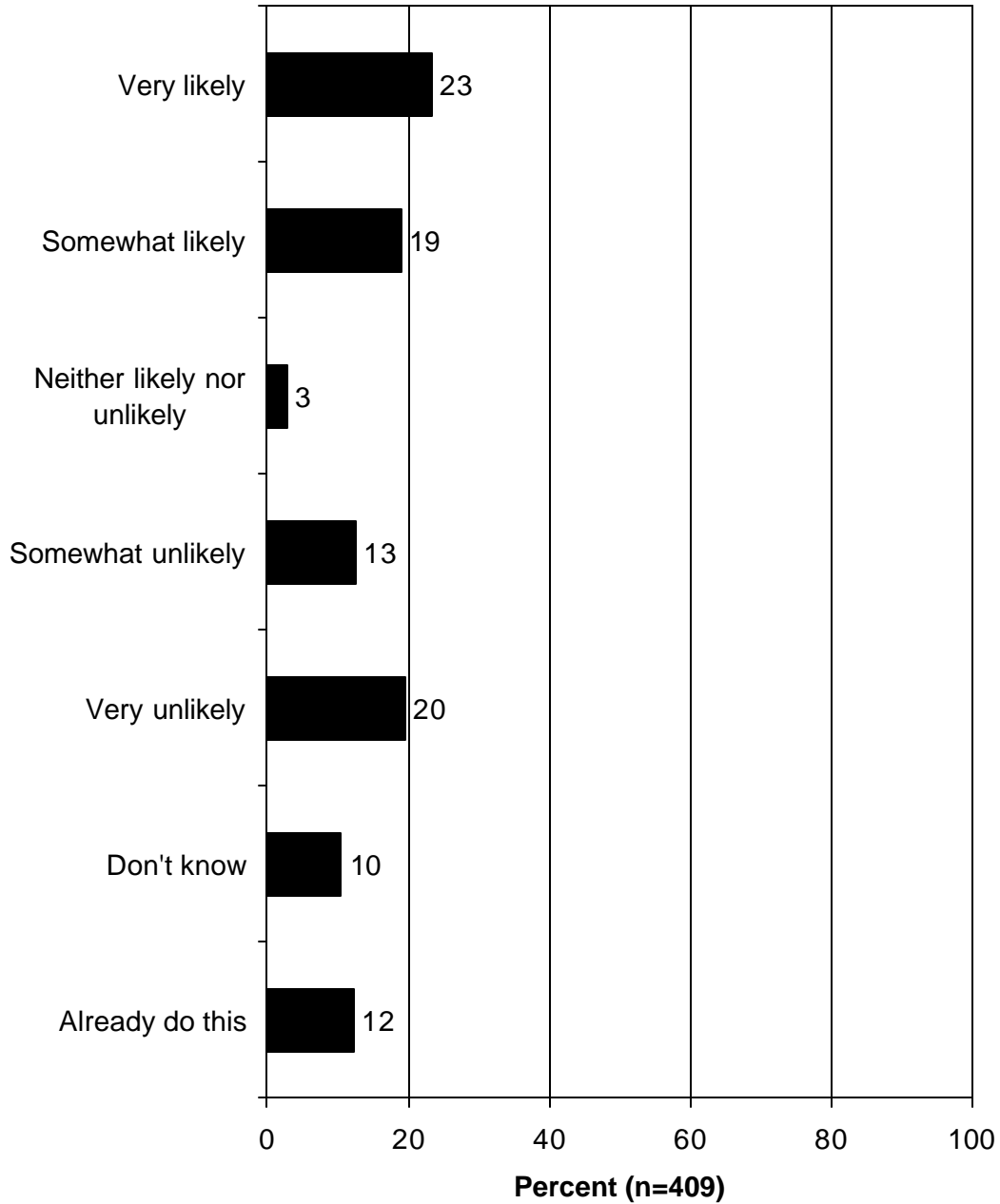
Q79. Do you support or oppose pervious pavement?



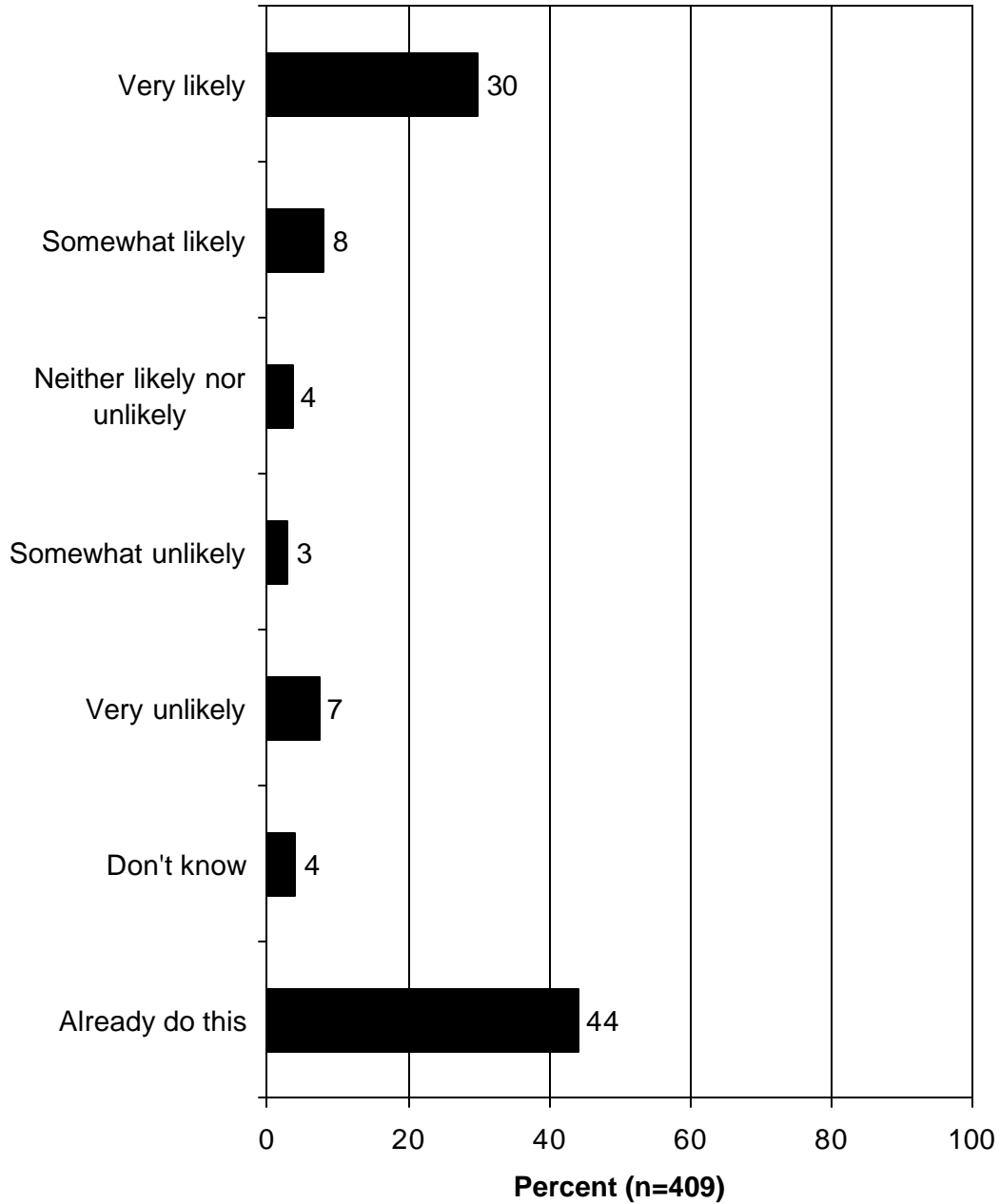
Q72-79. Percent who strongly oppose the following.



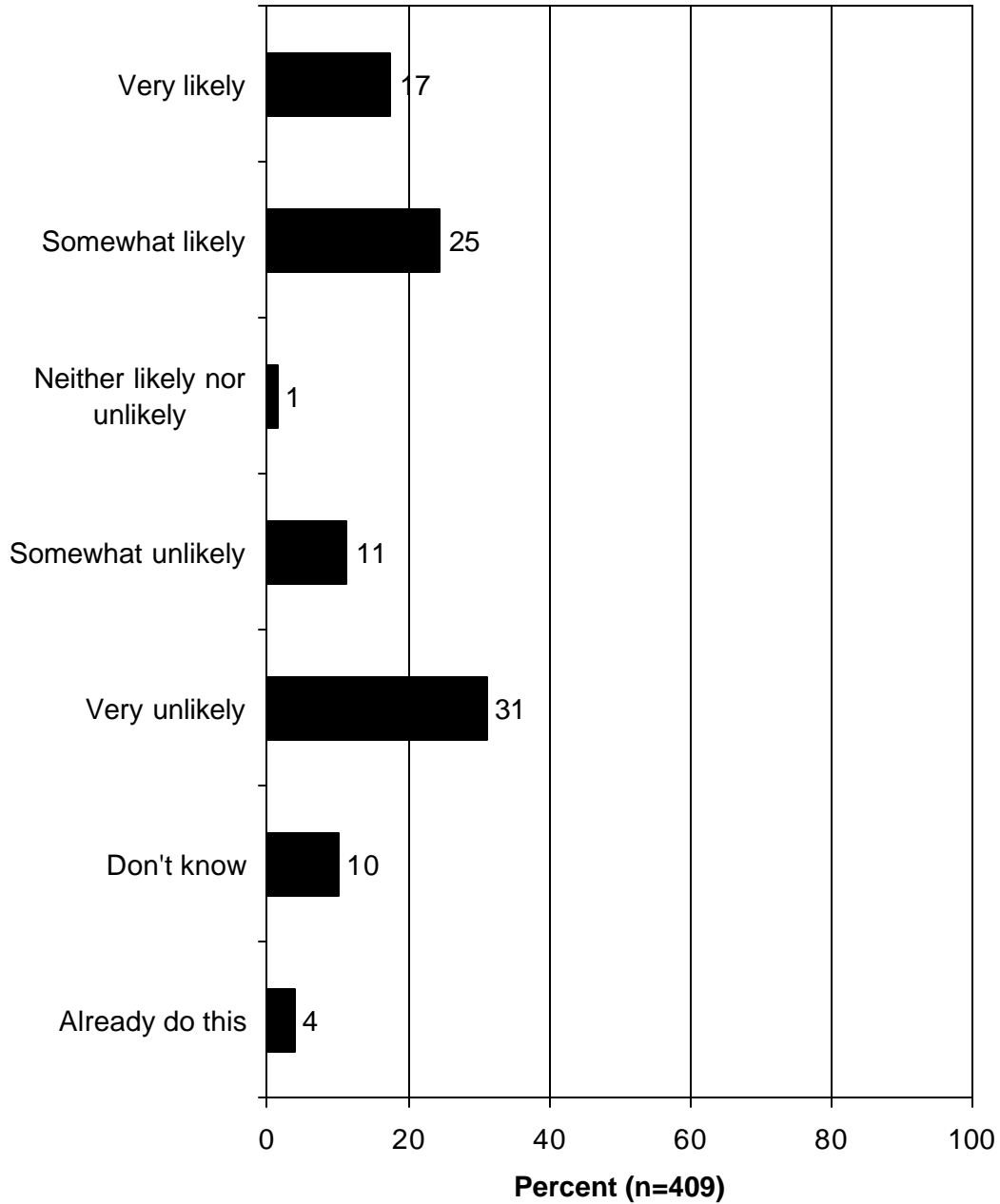
Q80. Would you be likely or unlikely to adopt a storm drain (keep surface grate free of debris)?



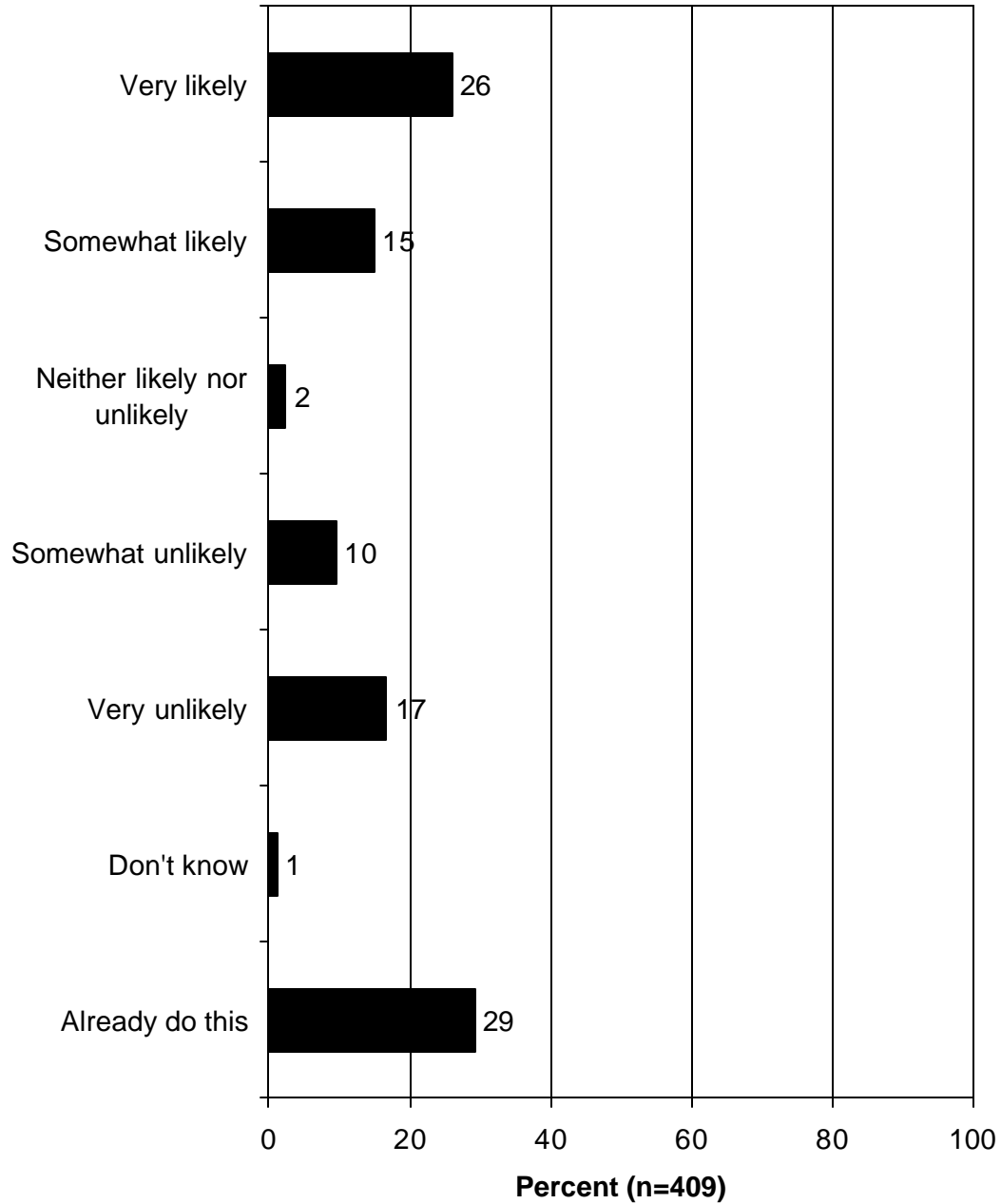
Q81. Would you be likely or unlikely to sweep your curb?



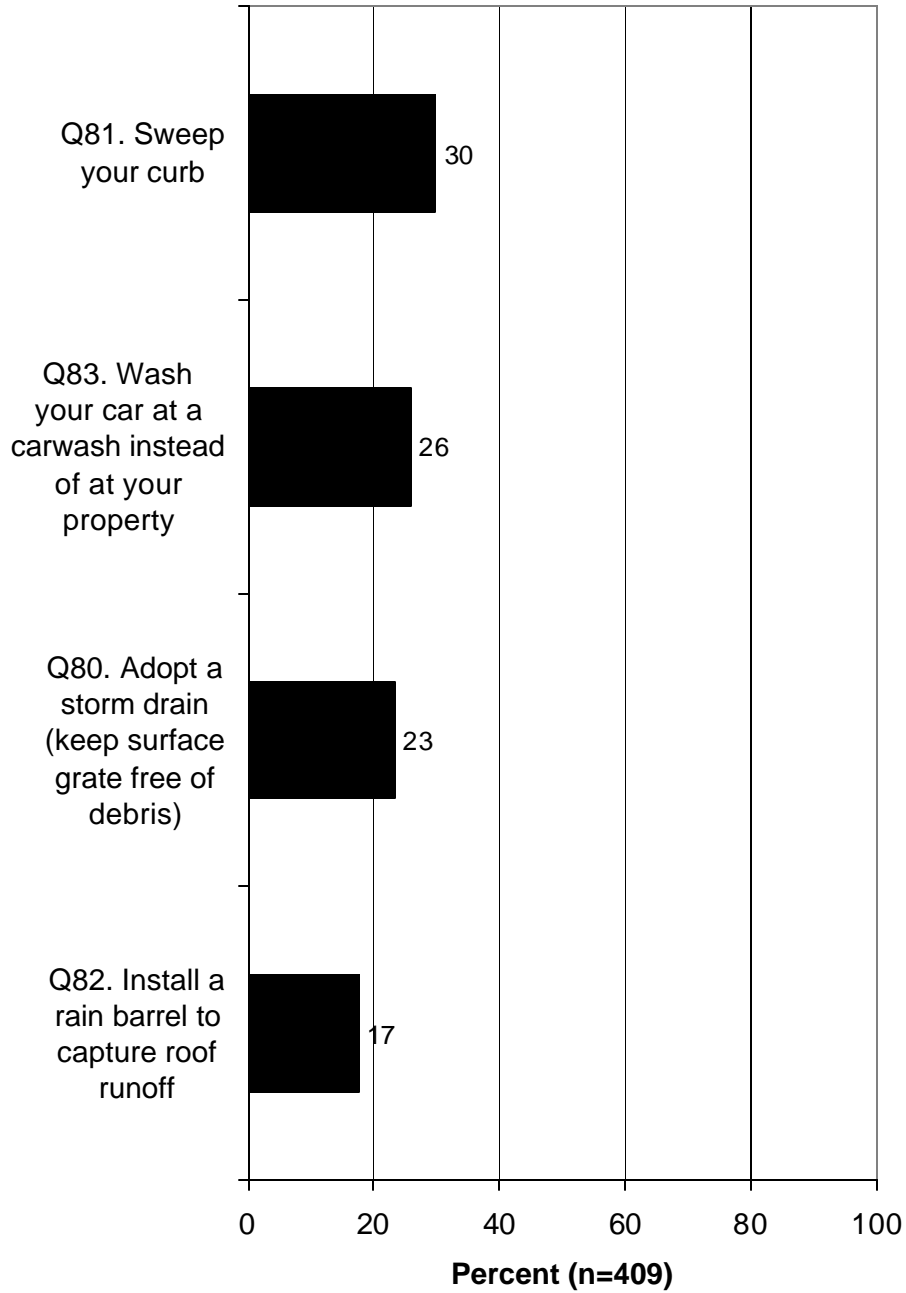
Q82. Would you be likely or unlikely to install a rain barrel to capture roof runoff?



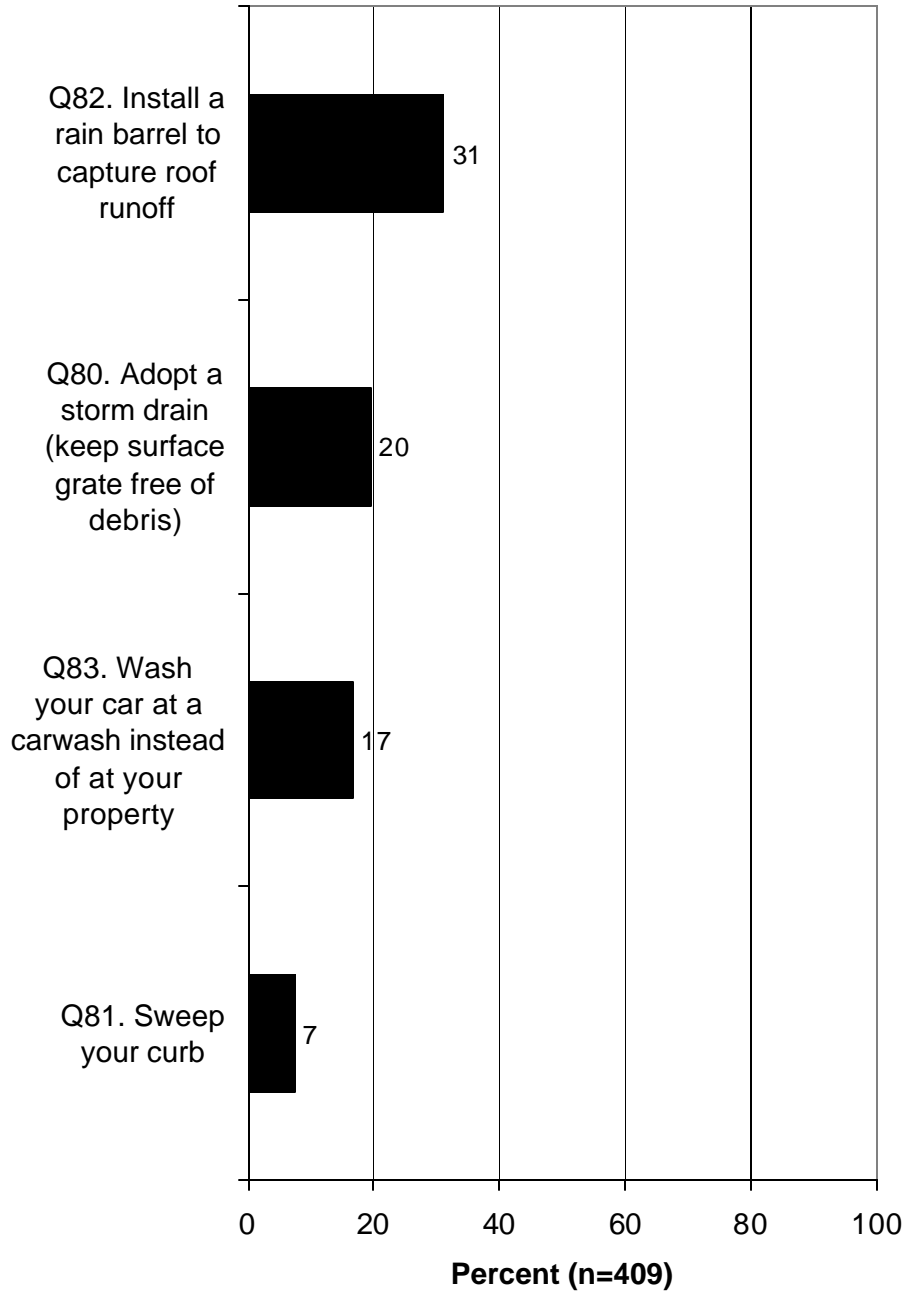
Q83. Would you be likely or unlikely to wash your car at a carwash instead of at your property?



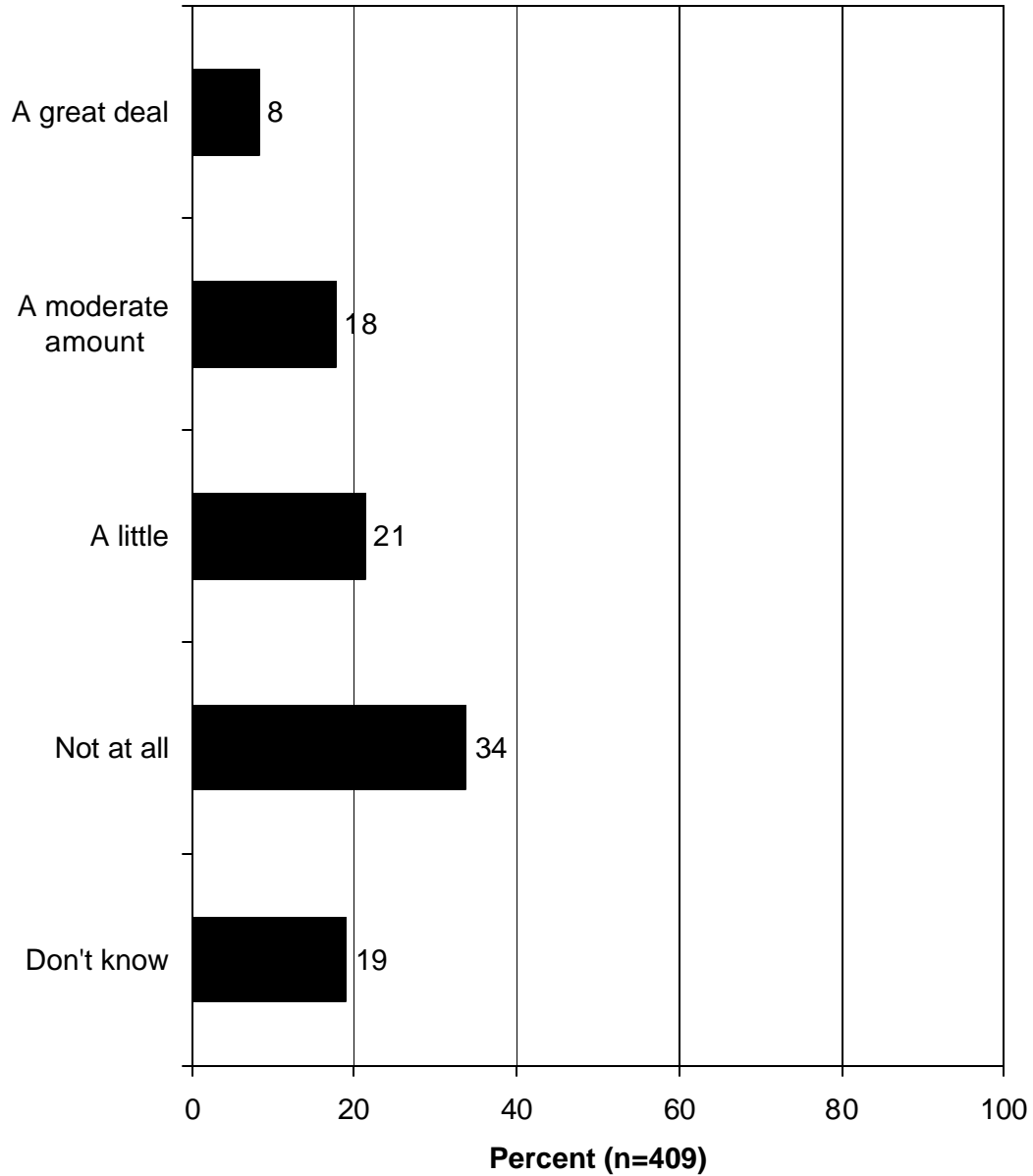
Q80-83. Percent who are very likely to do the following.



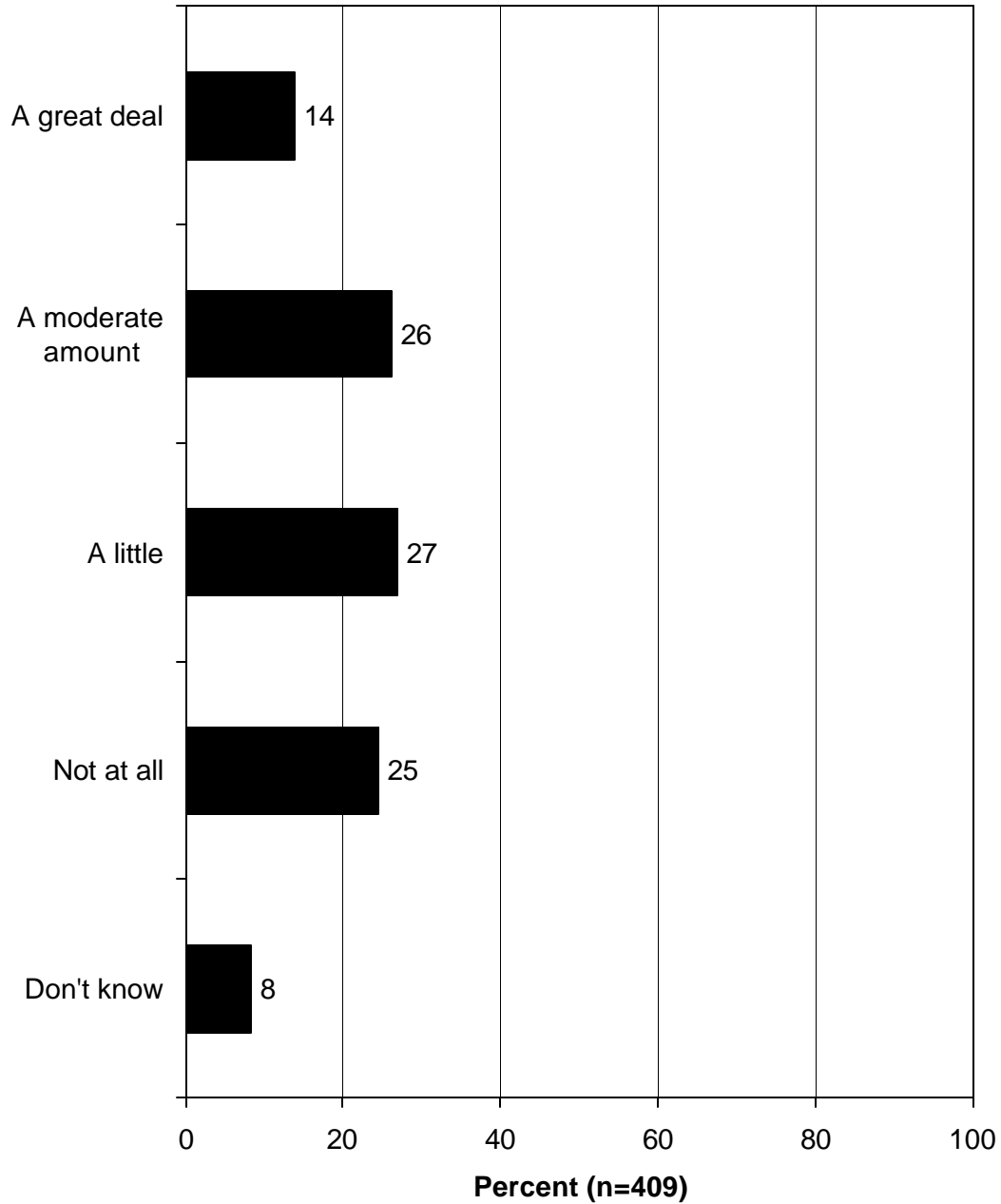
Q80-83. Percent who are very unlikely to do the following.



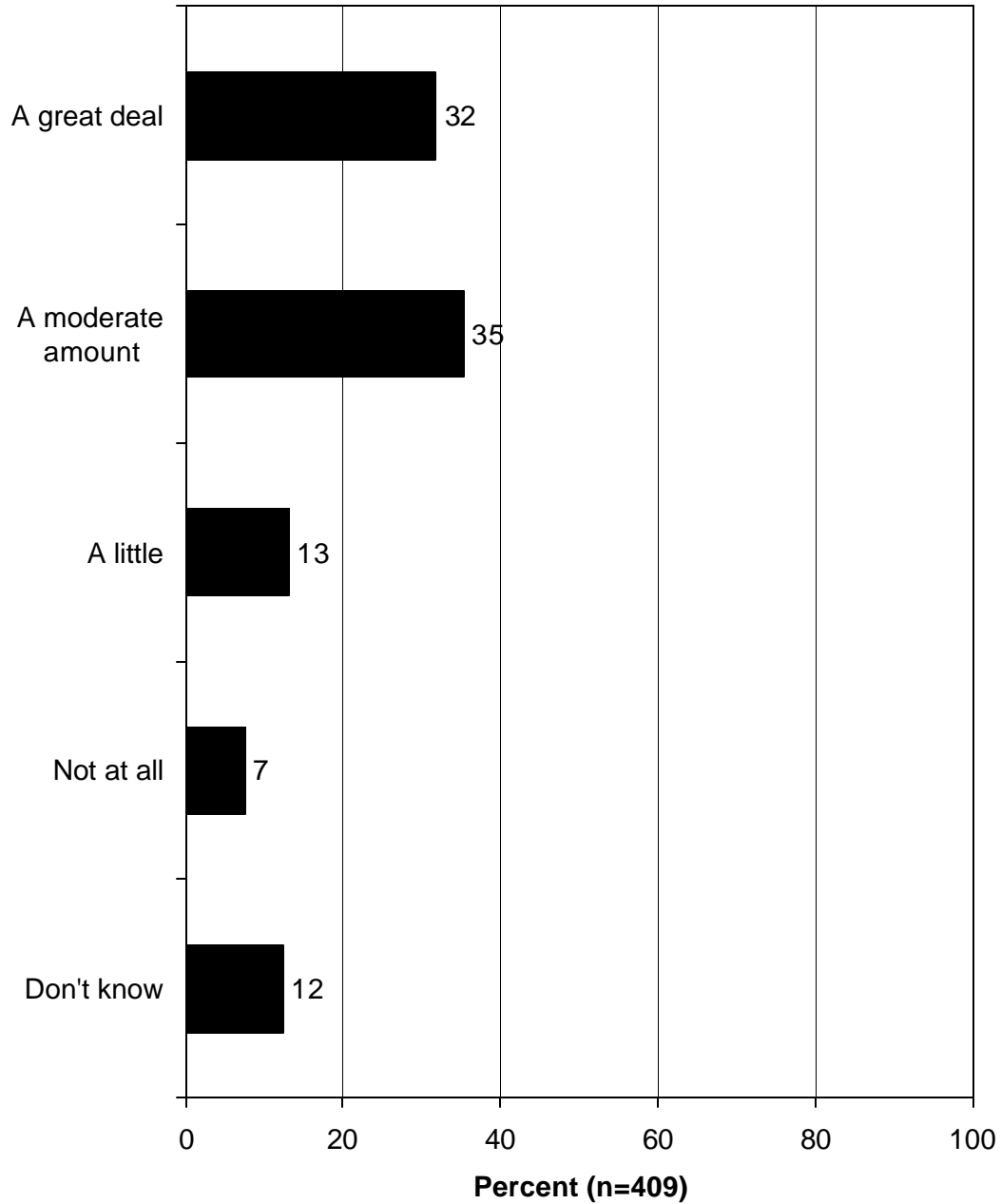
Q98. Would you say that on-lot sewage disposal or septic systems contribute a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



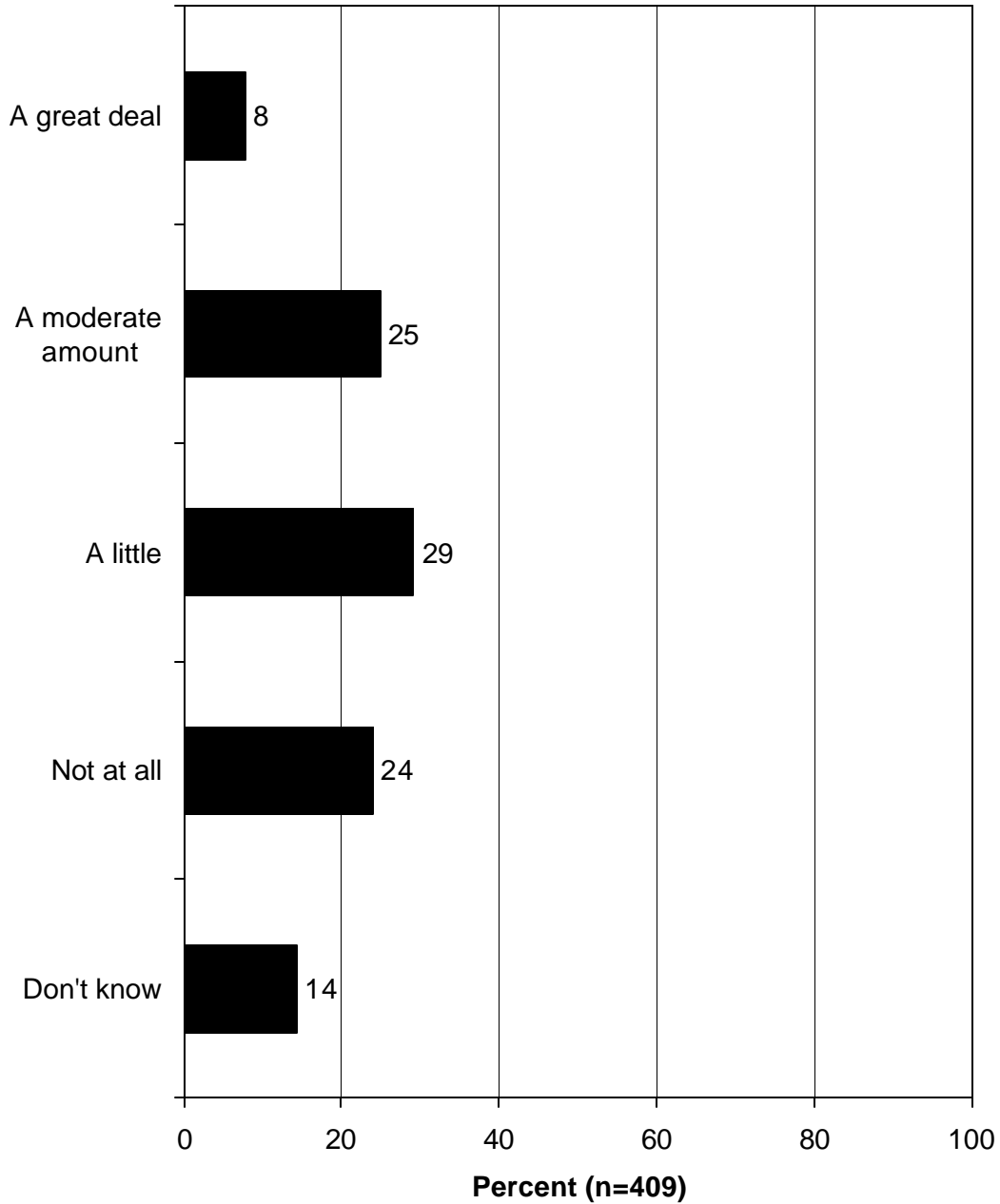
Q99. Would you say trash contributes a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



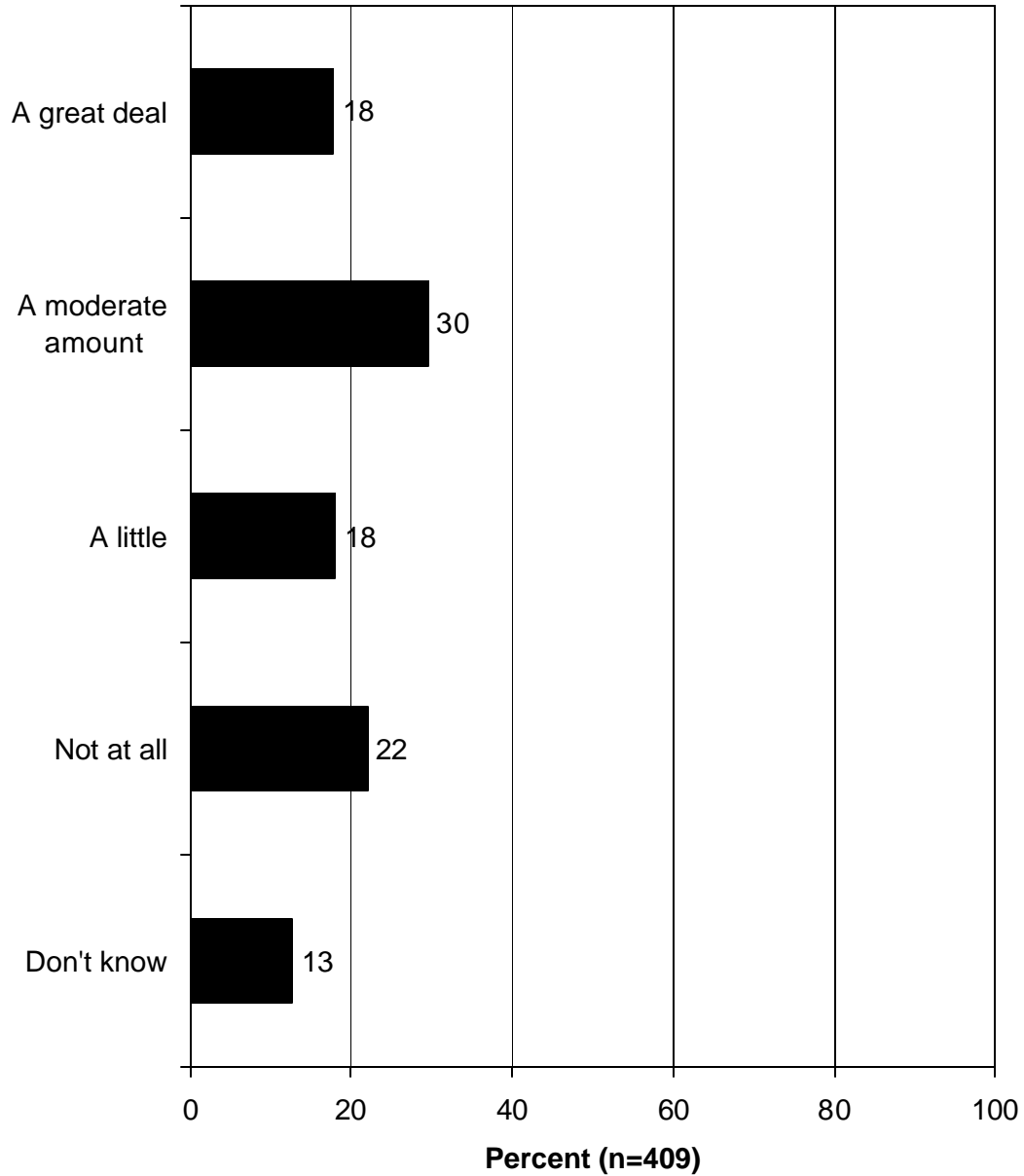
Q100. Would you say lawn chemicals contribute a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



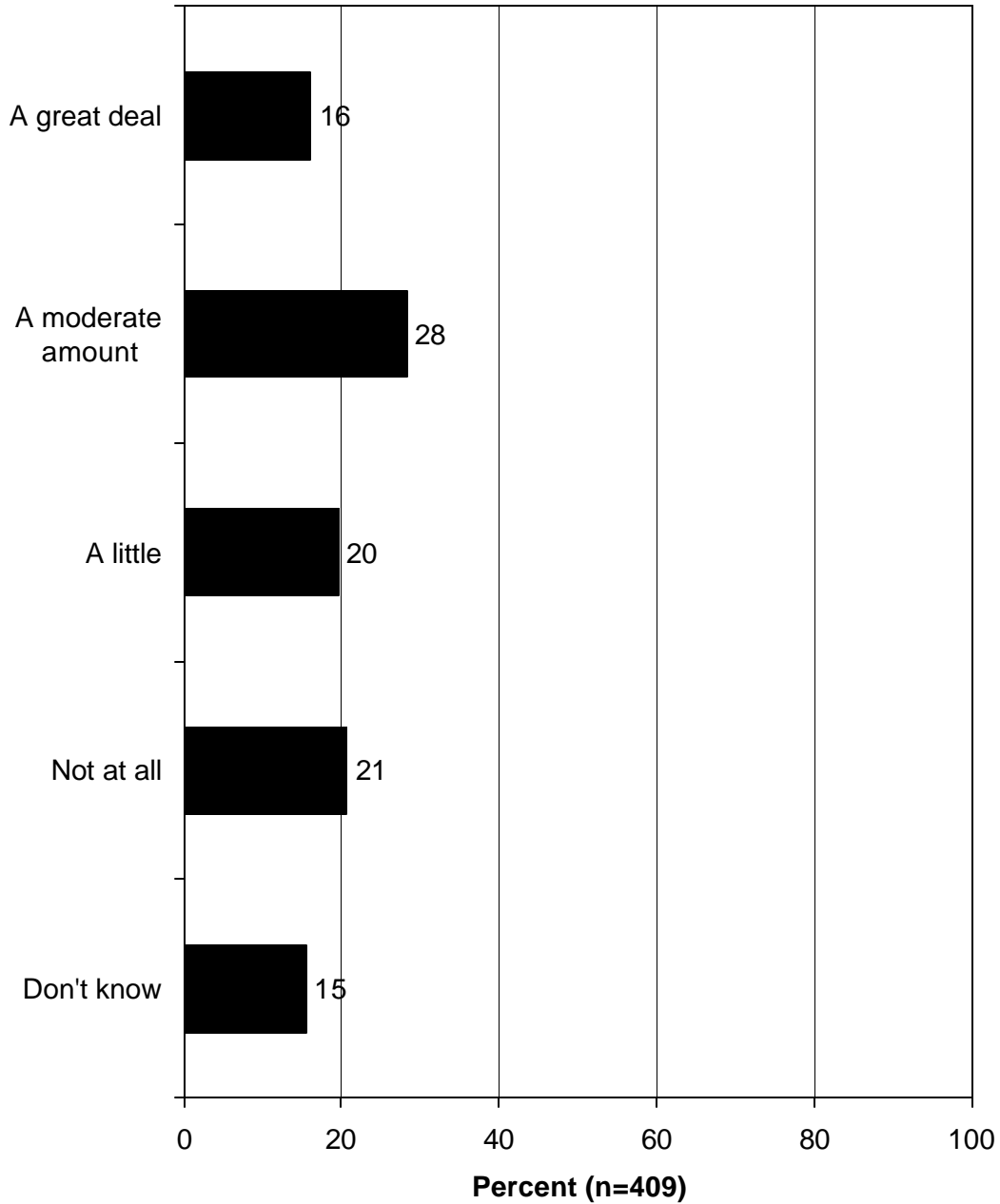
Q101. Would you say pet waste contributes a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



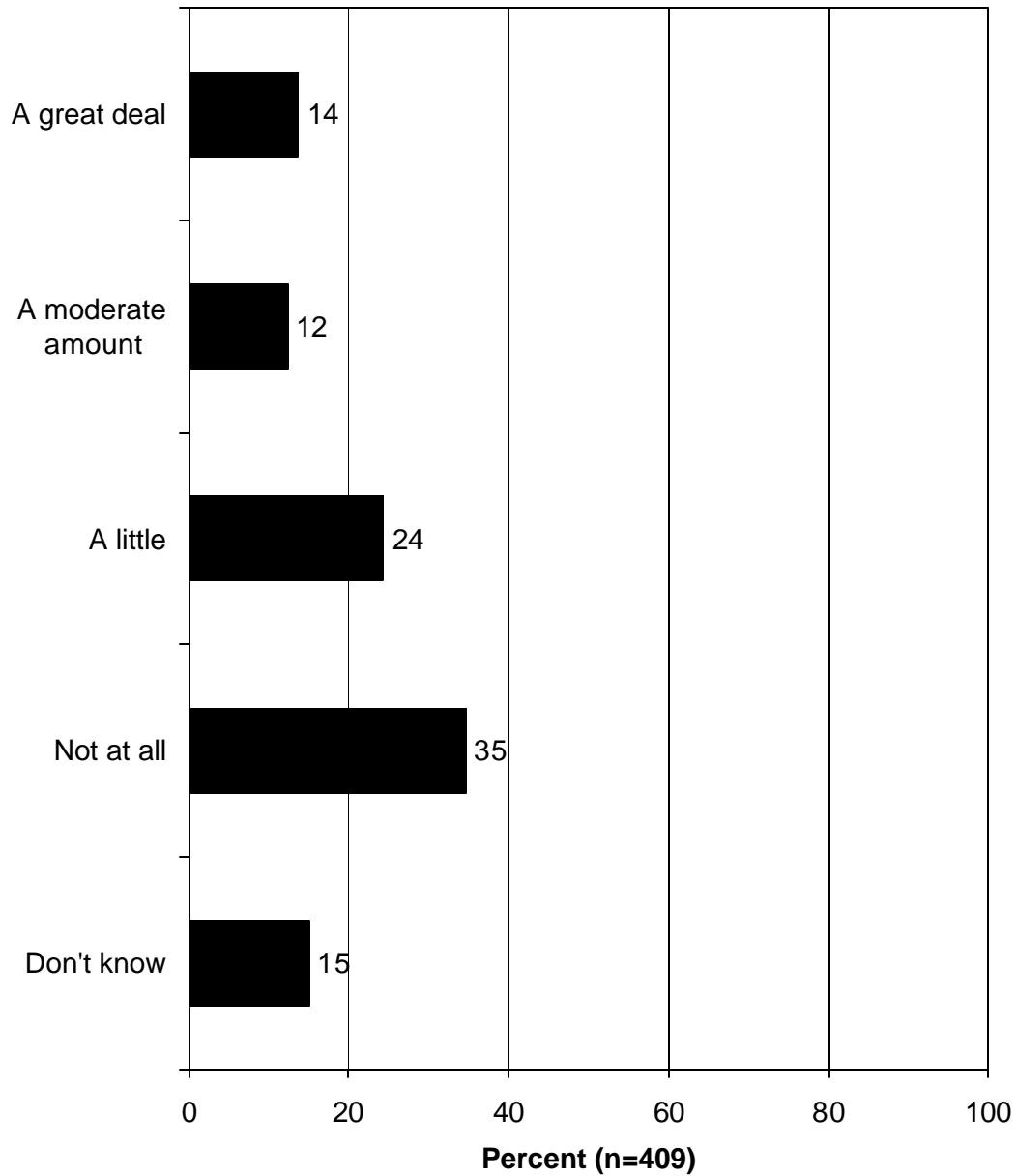
Q102. Would you say soil erosion from disturbed areas contributes a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



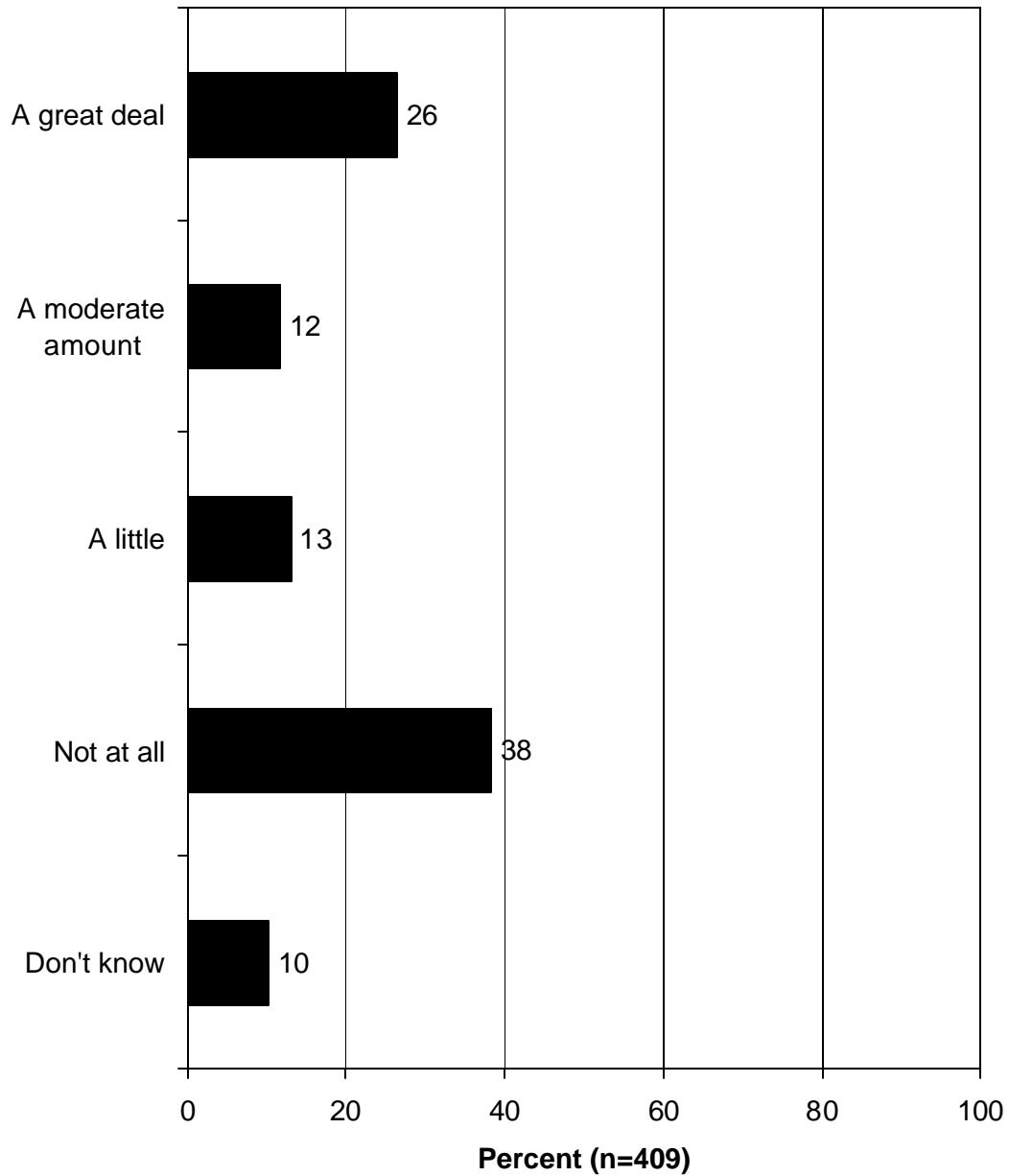
Q103. Would you say erosion of stream banks contributes a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



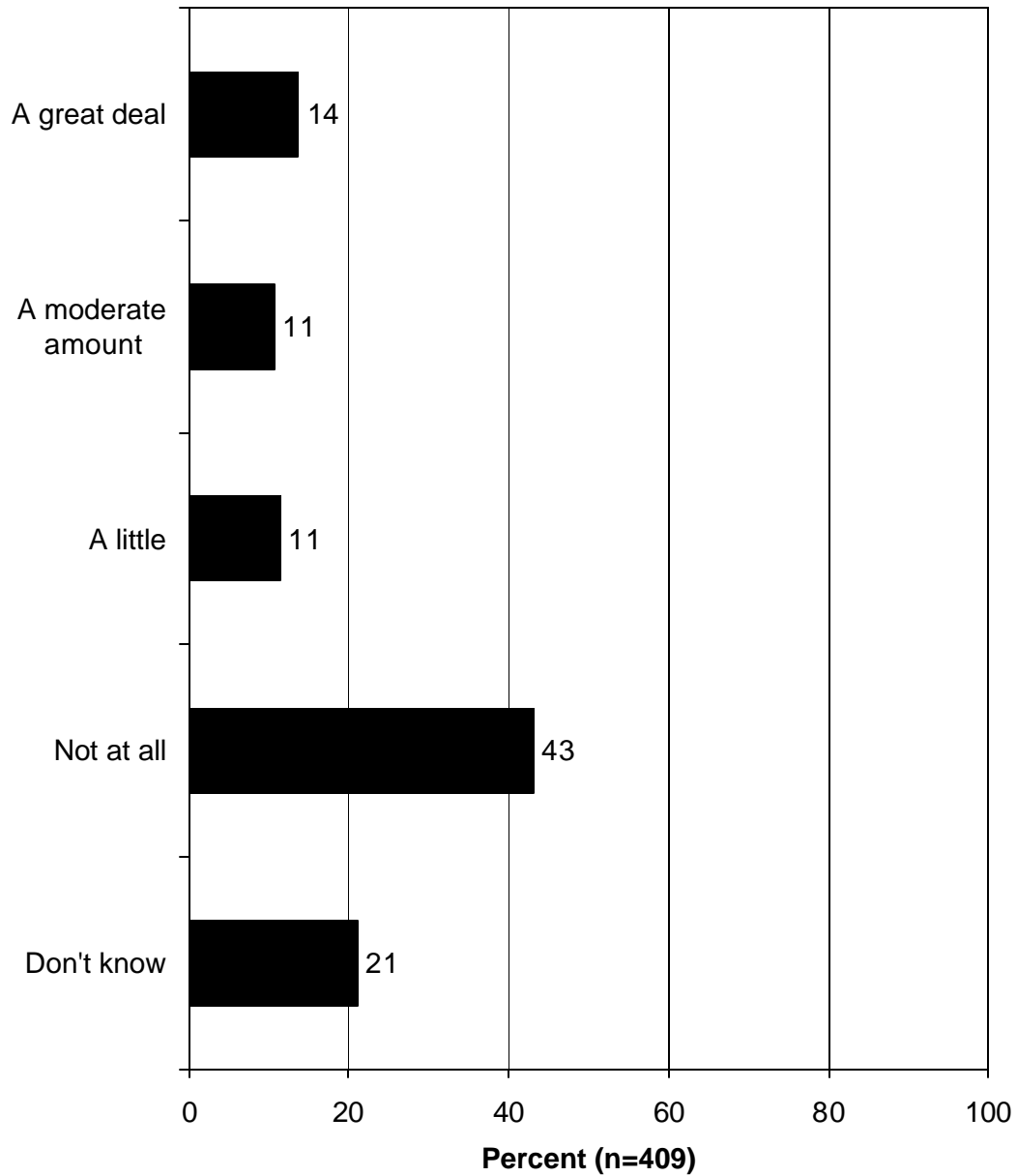
Q104. Would you say animal manure (from fields, storage facilities, or animals in the stream) contributes a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



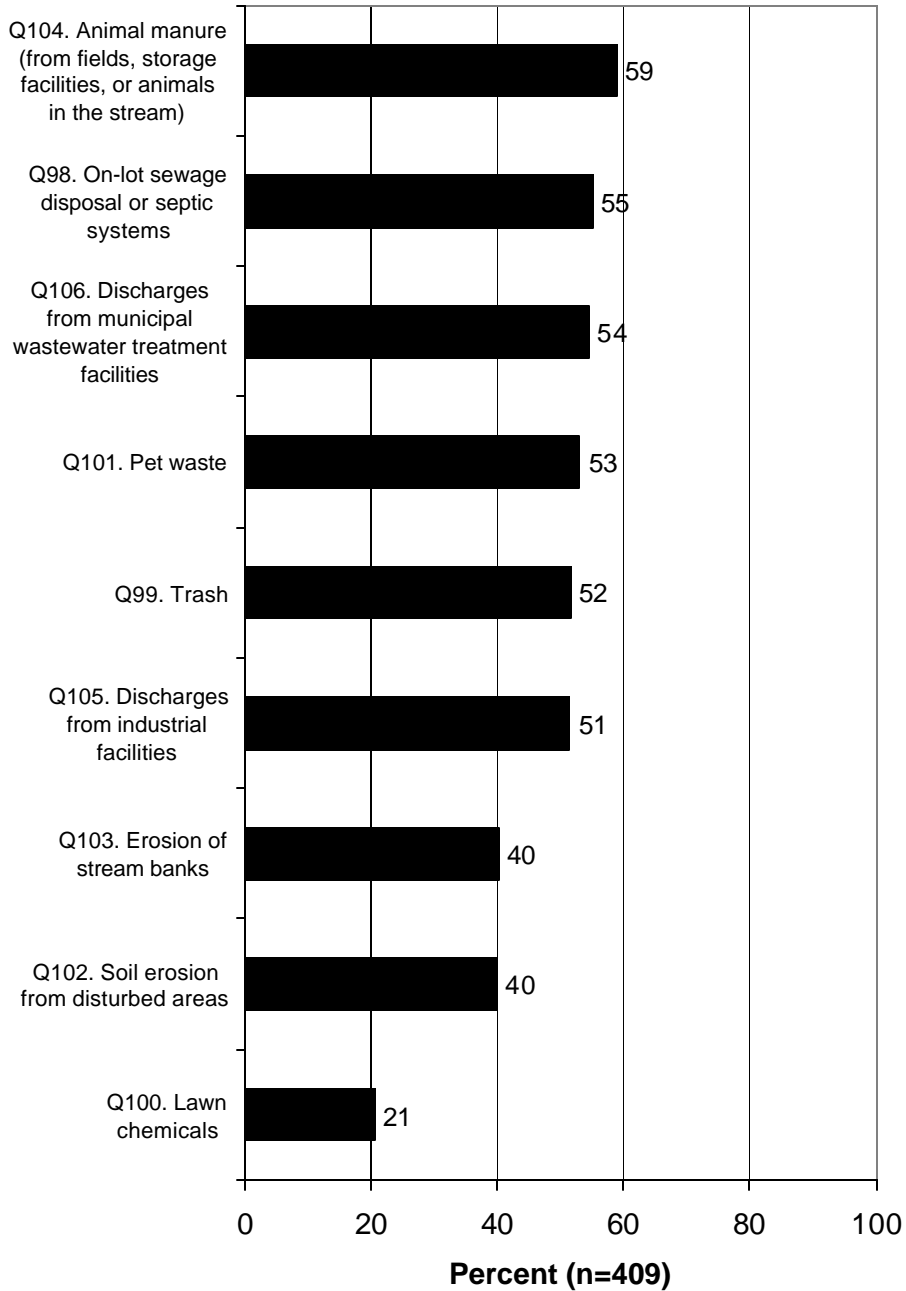
Q105. Would you say discharges from industrial facilities contribute a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



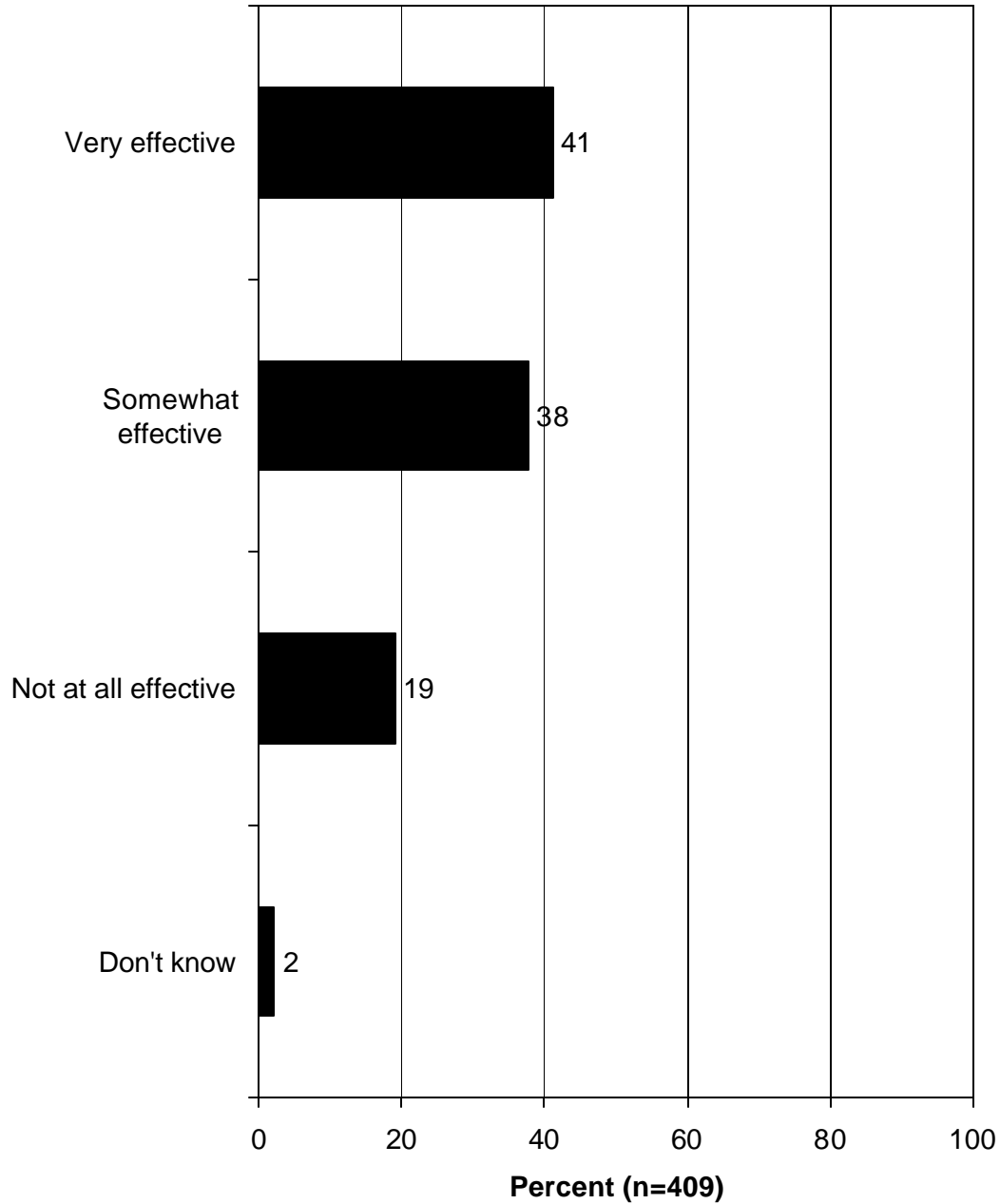
Q106. Would you say discharges from municipal wastewater treatment facilities contribute a great deal, a moderate amount, a little, or not at all to water pollution in the streams nearest your neighborhood and house?



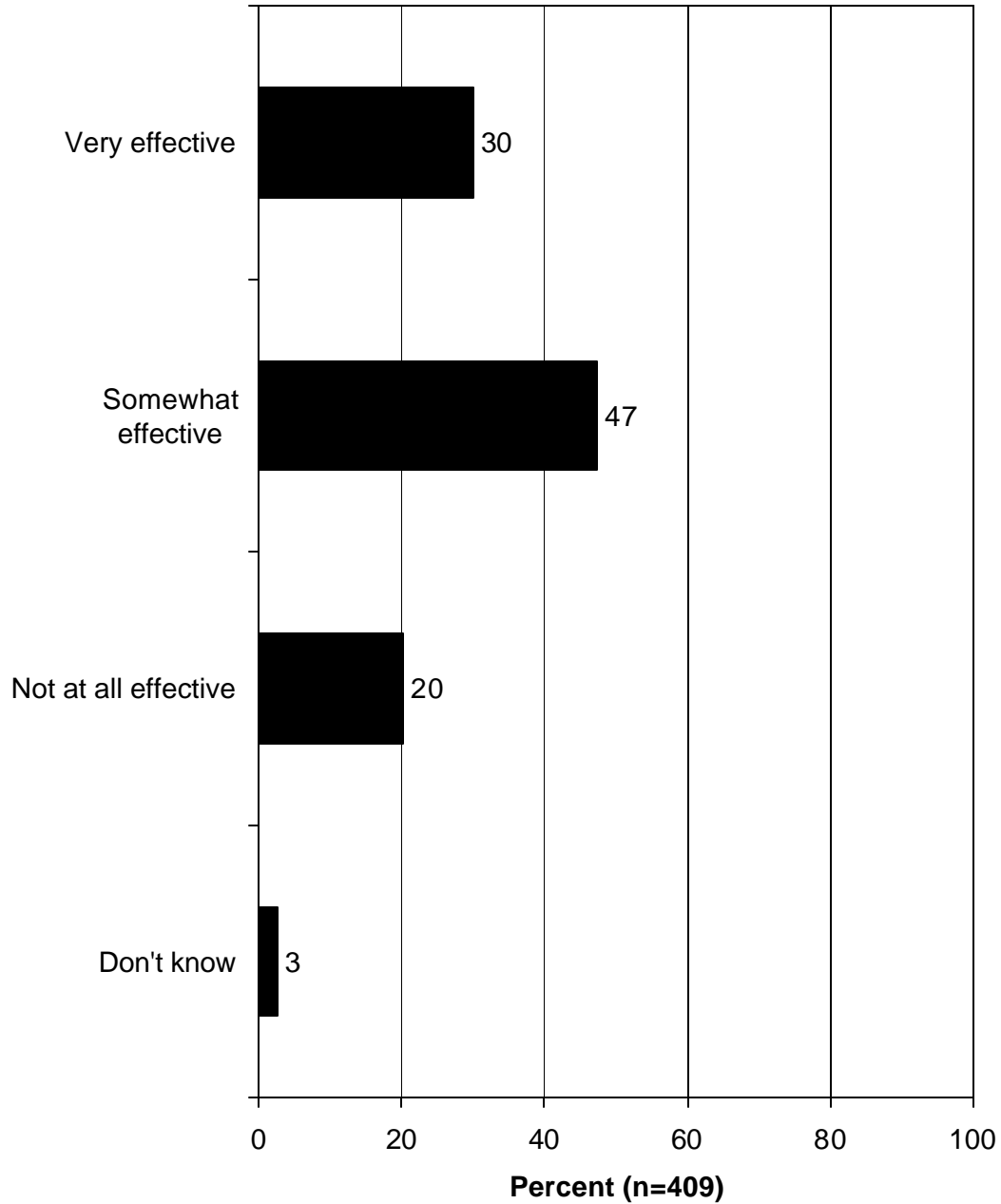
Q98-106. Percent who said that the following contributes a little or not at all to water pollution in the streams nearest their neighborhood.



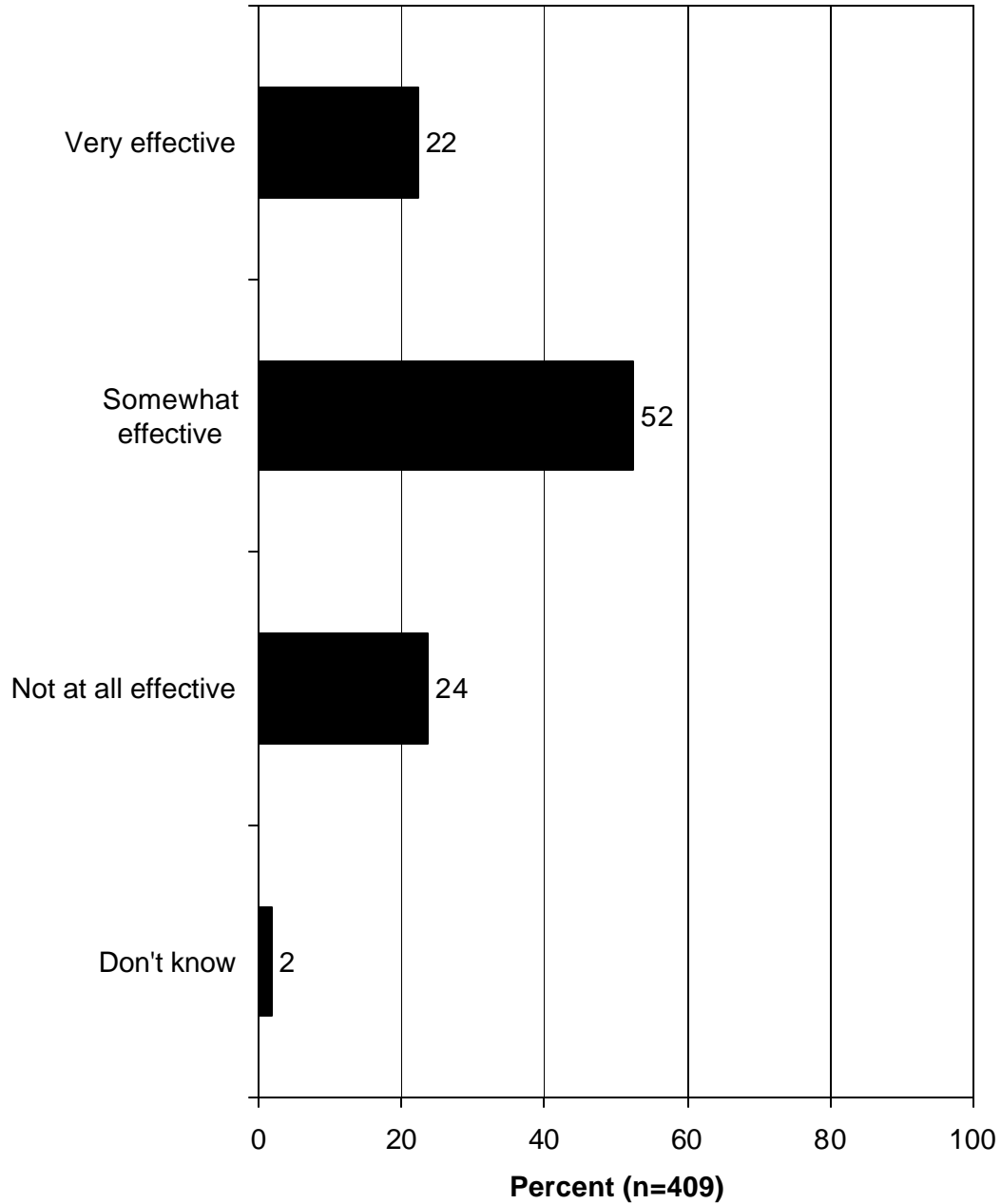
Q108. Would newspapers be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



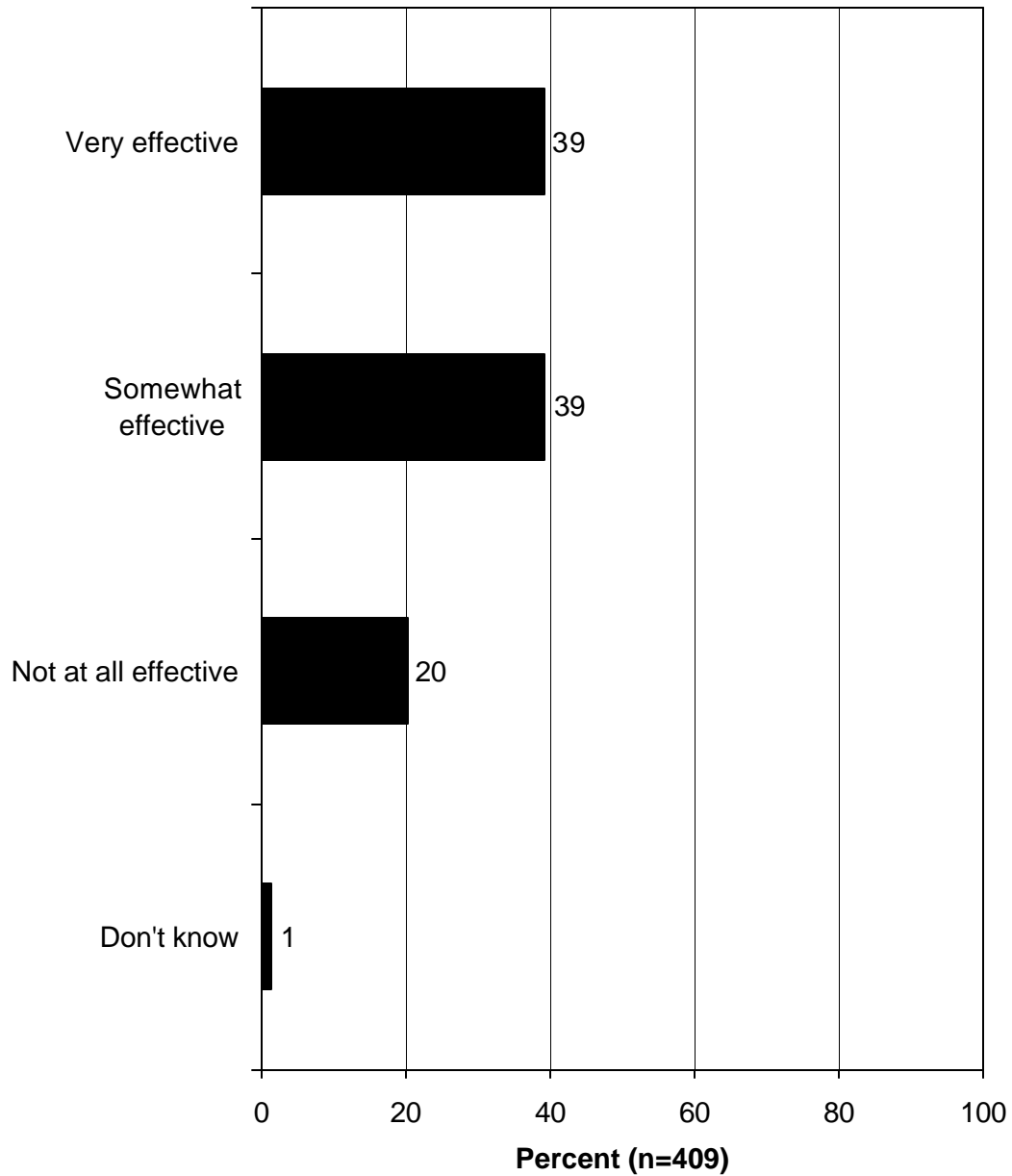
Q109. Would TV be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



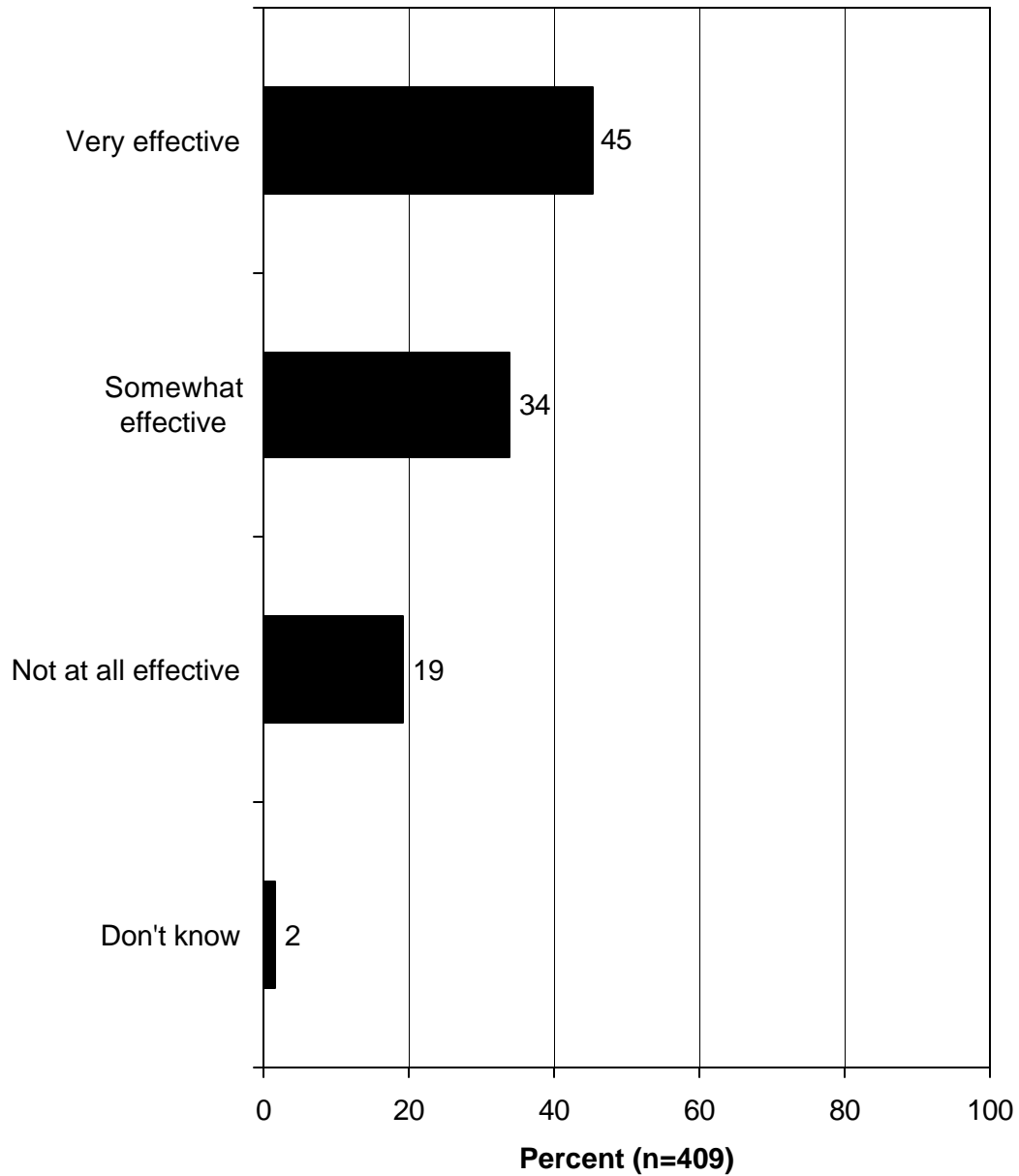
Q110. Would radio be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



Q111. Would brochures mailed to your house be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



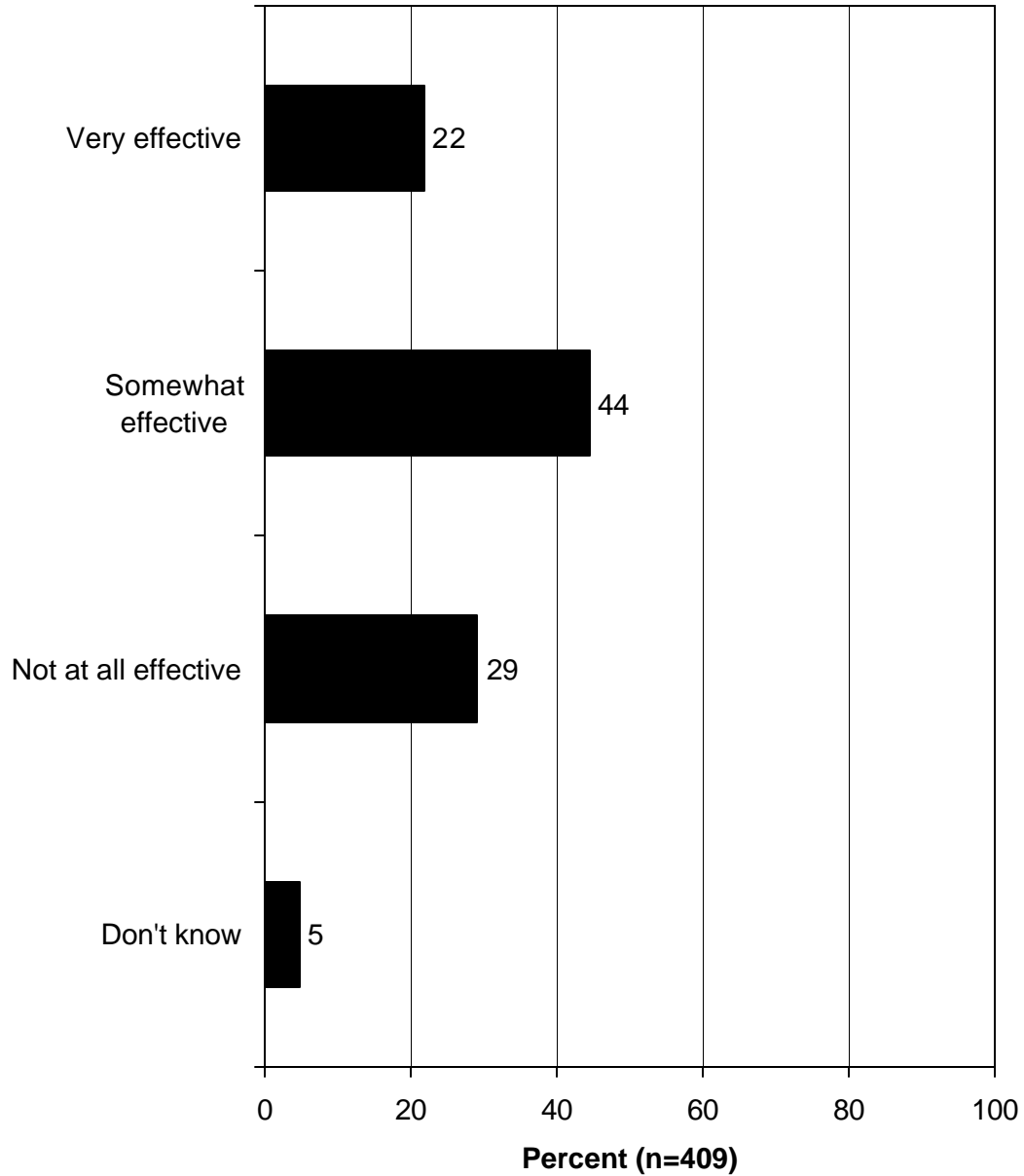
Q112. Would a civic association newsletter be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



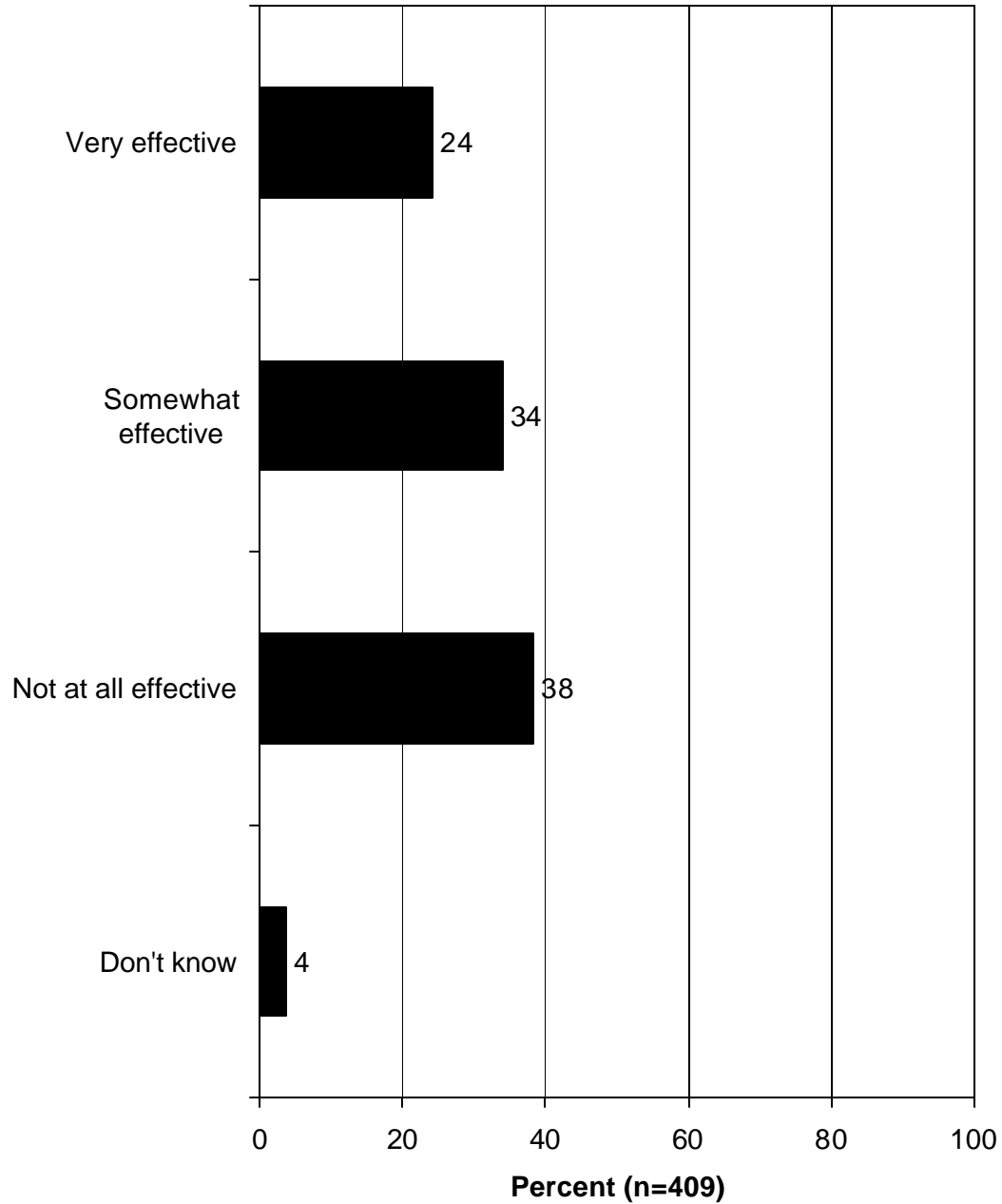
Q113. Would demonstrations at outreach events be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



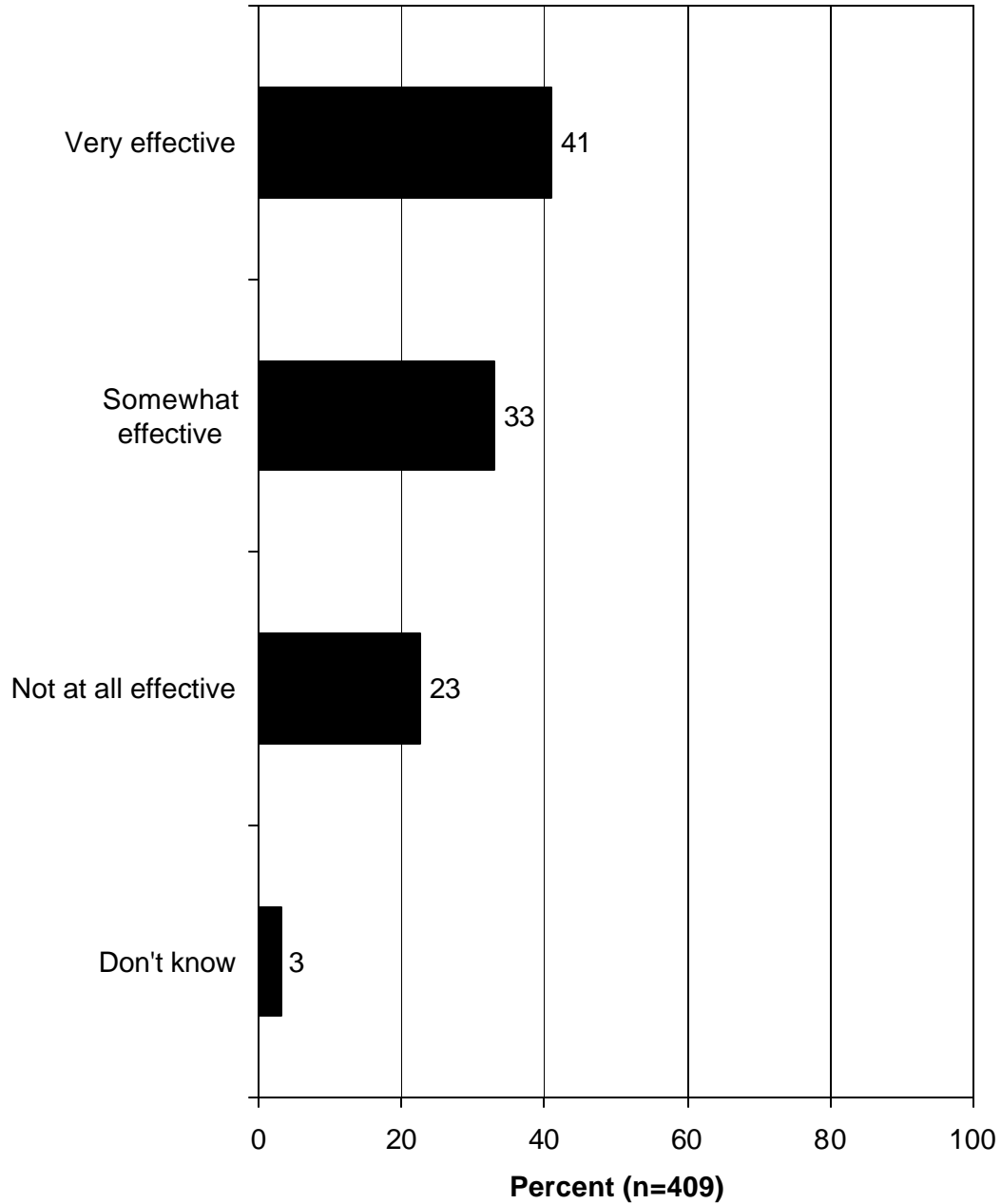
Q114. Would presentations at meetings be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



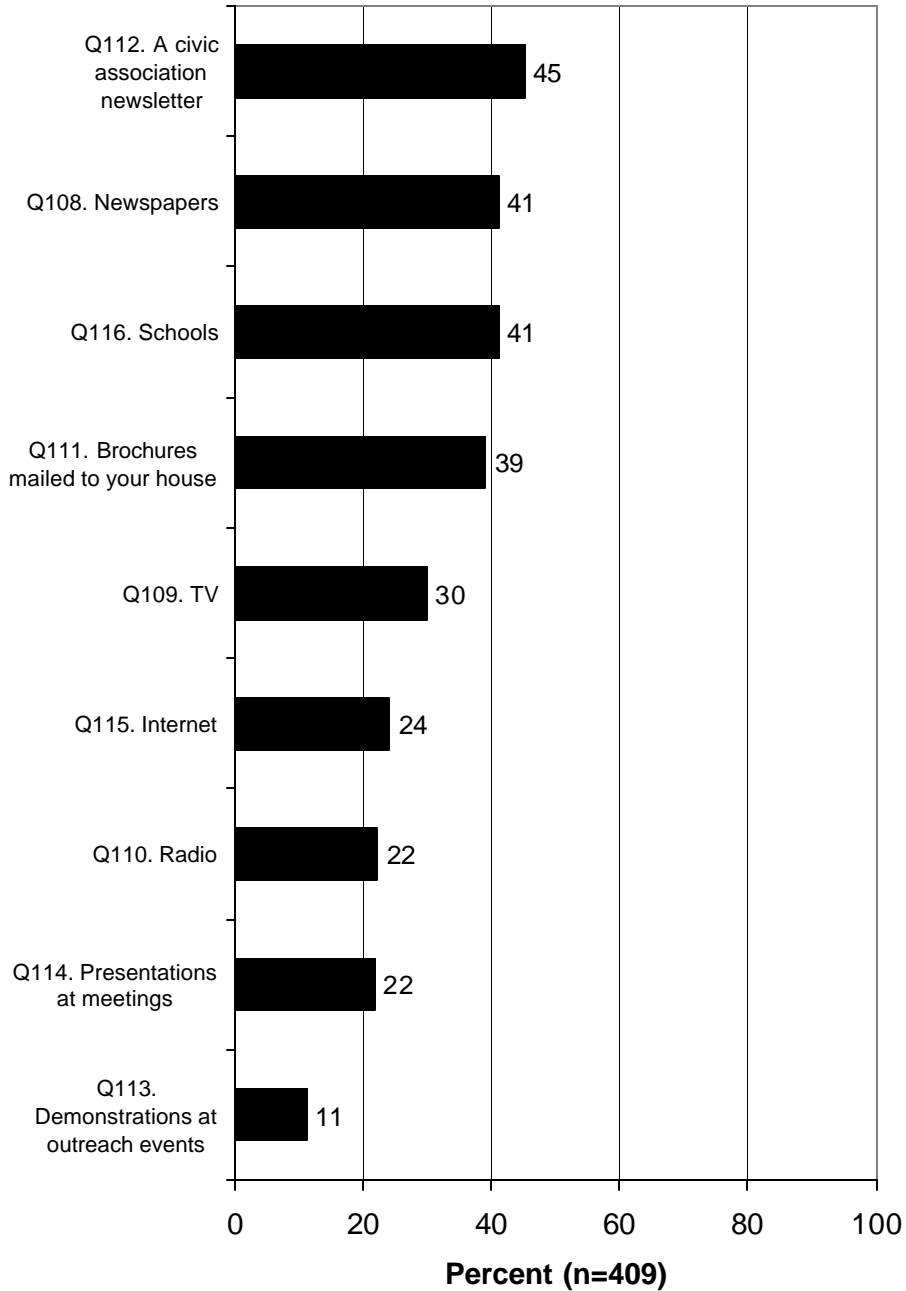
Q115. Would the Internet be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



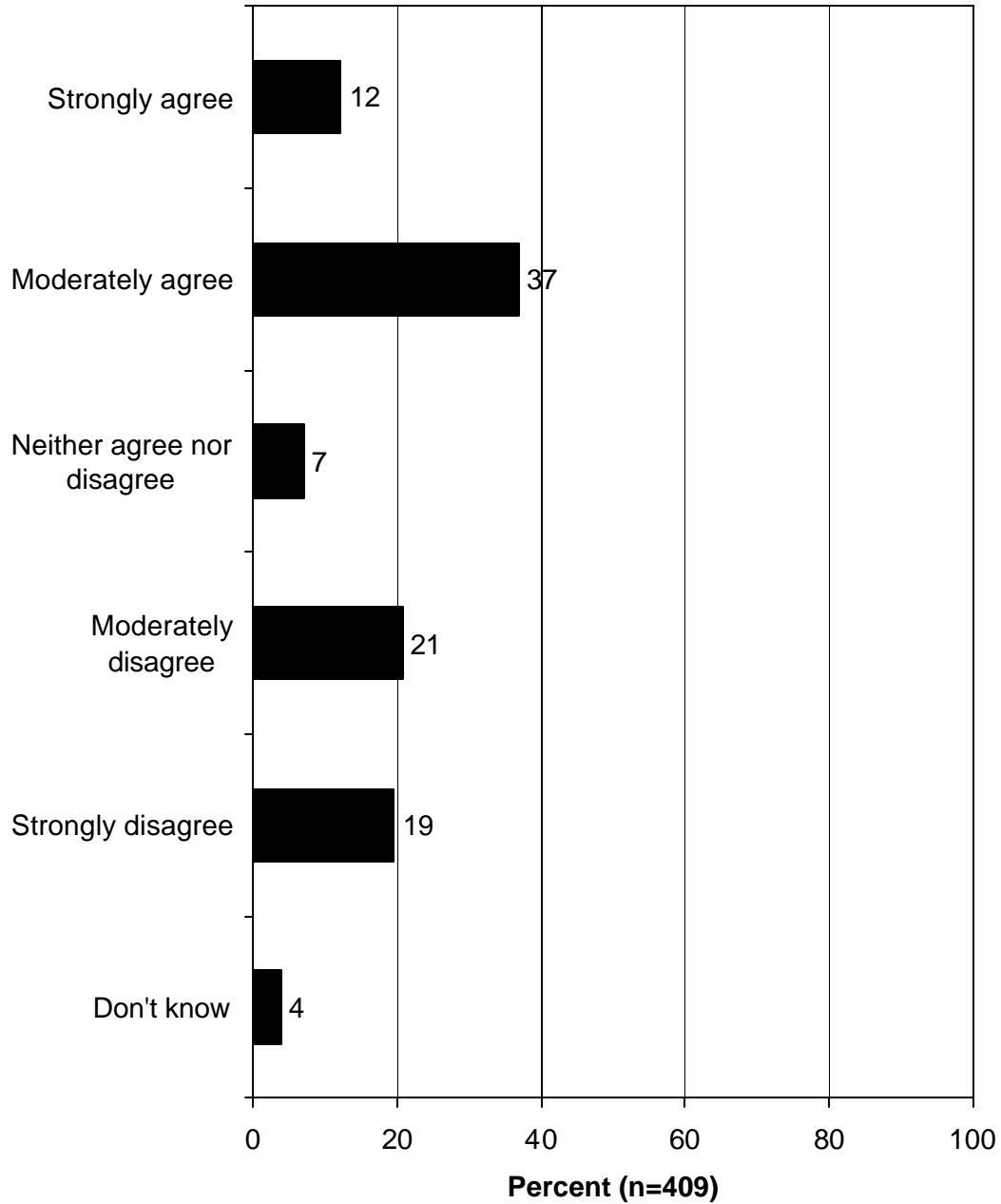
Q116. Would schools be very effective, somewhat effective, or not at all effective at providing you with information regarding water quality and ways to protect water quality?



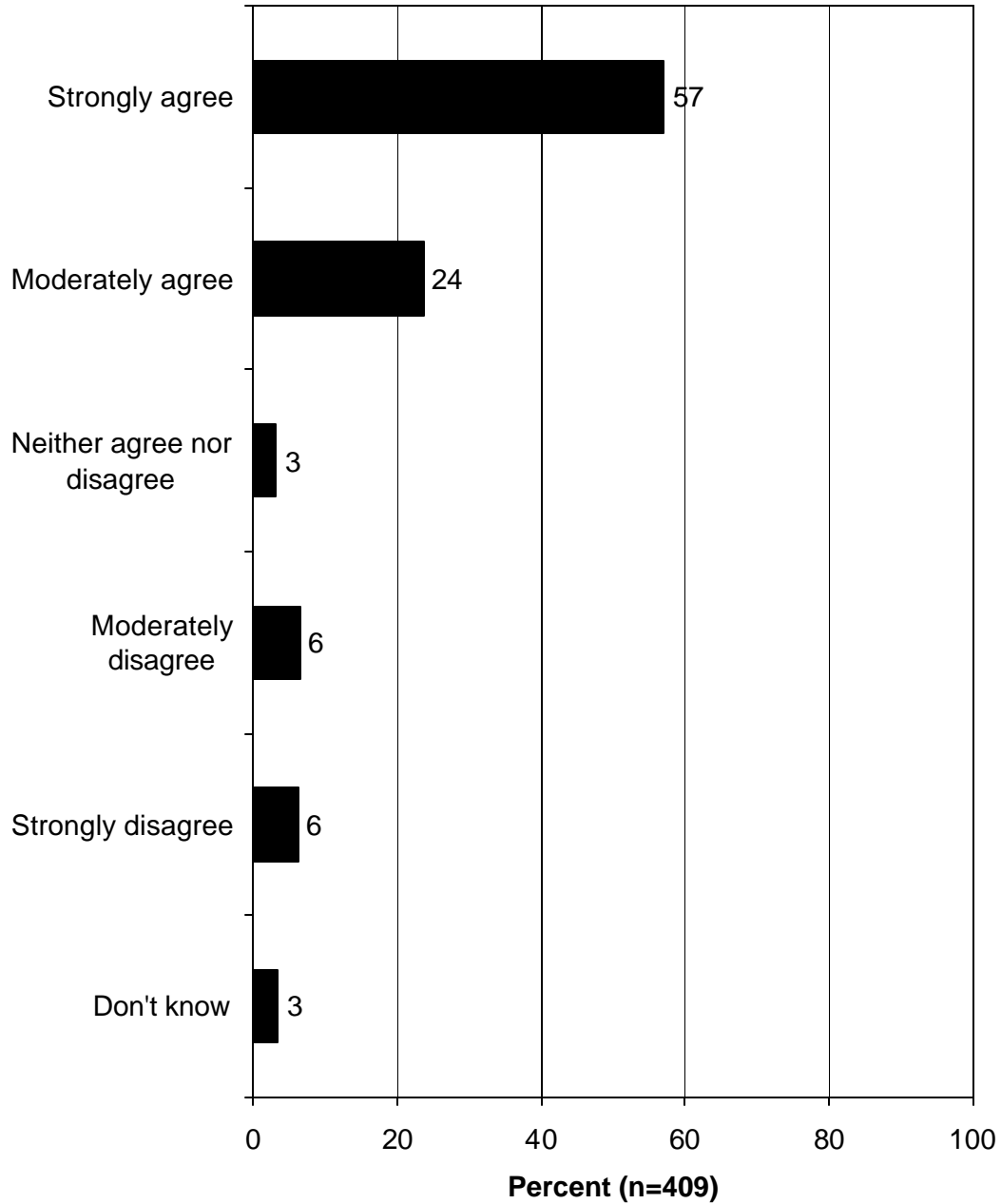
Q108-116. Percent who think the following are very effective ways for DNREC to provide them with information regarding water quality and ways to protect water quality.



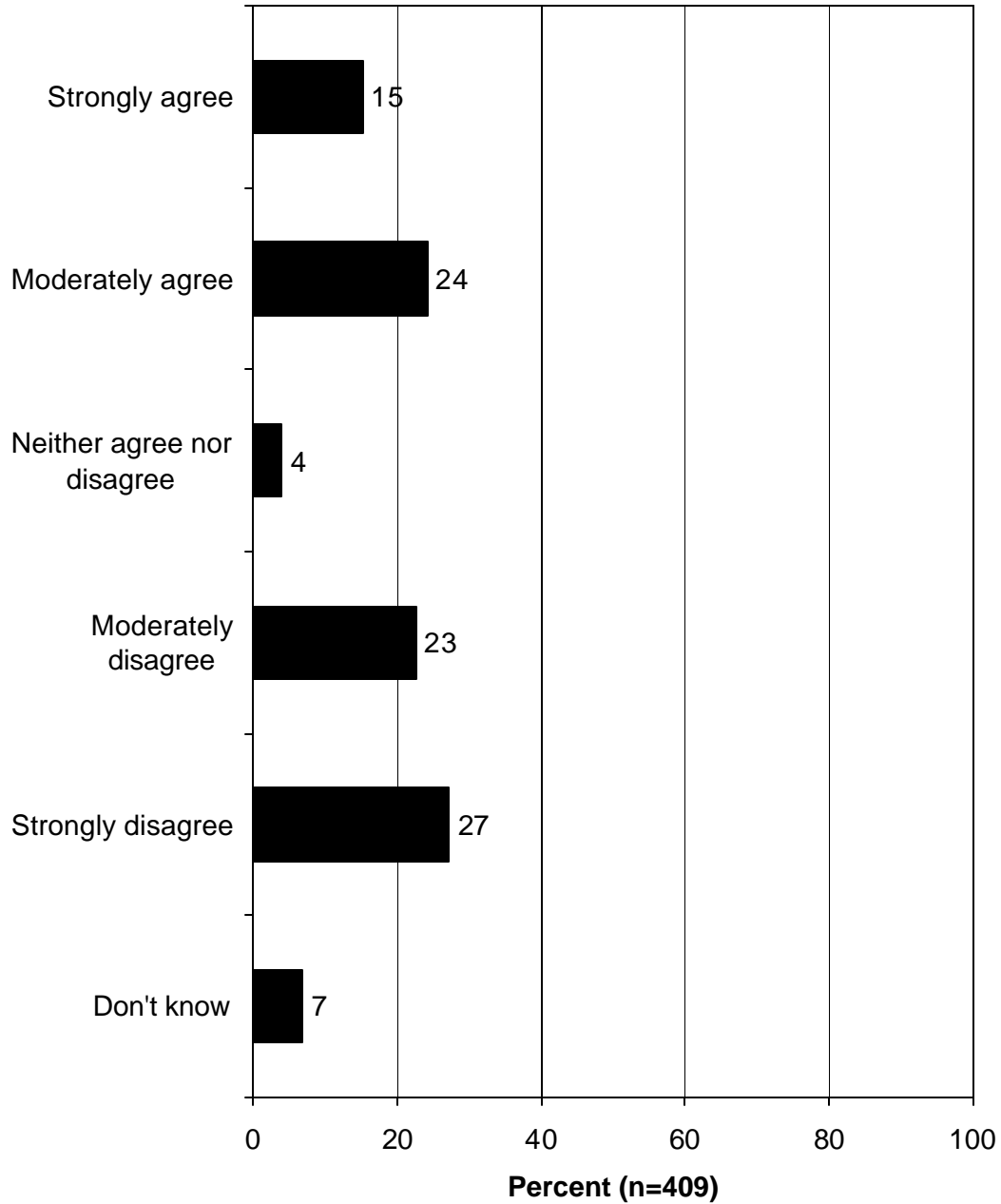
Q118. Would you say that you agree or disagree with the following statement? Humans have the right to modify the natural environment to suit their needs.



Q119. Would you say that you agree or disagree with the following statement? Plants and animals have as much right as humans to exist.



Q120. Would you say that you agree or disagree with the following statement? Humans were meant to rule over the rest of nature.



Q118-120. Percent who strongly disagree with the following statements.

