



NSW Shark Management Strategy

NSW Department of Primary
Industries

Wave 2 report

June 2023

EY Sweeney reference: 31813

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The results of EY's work, including the assumptions and qualifications made in preparing the report, are set out in EY's report dated June 2023 ("Report"). You should read the Report in its entirety including any disclaimers and attachments. A reference to the Report includes any part of the Report.

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Introduction and background

In 2015, following an increase of shark incidents in NSW, the Department of Primary Industries (DPI) implemented the NSW Shark Management Strategy (SMS). This five-year program aimed to protect beachgoers by reducing the chance of shark encounters while minimising harm to sharks and other marine species. The SMS program focused on trialling new technologies; and research identified drone aerial surveillance, SMART drumlines and VR4G listening stations as the most effective mitigation technologies and preferred by the community and coastal Councils to increase the protection of beachgoers, while minimising harm to sharks and other marine animals.

The NSW Shark Management Program (SMP), which now succeeds the SMS program, aims to continue the shark mitigation program and deploy the evidence-based shark mitigation measures along the NSW coastline.

DPI commissioned EY Sweeney to undertake quantitative research, among the community and stakeholders, to assess sentiment of shark mitigation approaches currently used in the SMP, and confidence in the SMP to reduce the risk of human-shark interactions at ocean beaches. The first wave of the quantitative community and stakeholder research study was conducted in June 2022.

This report outlines the findings and insights from the second wave of the research conducted in December 2022 to March 2023.

The research approach

- ▶ A total of 500 NSW/ACT residents, 336 beachgoers across 10 NSW popular ocean beaches, 24 coastal councils, 50 stakeholder groups and 2,651 individuals completed a 15 minute survey (online or face to face for the beachgoers) between 11 December 2022 and 3 March 2023.
- ▶ The survey data of the NSW/ACT resident sample was weighted to be representative of the NSW/ACT population based on ABS census data.

Key findings

Overall confidence in shark mitigation measures used in NSW ocean beaches has increased marginally from 2.96 to 3.04 out of 5

Across cohorts, the average overall confidence score for each cohort has remained relatively stable with the exception of Opt-In individuals where a significant increase in confidence is observed (from 2.5 to 2.9). This increase is likely due to the change in sample composition for this cohort (i.e. more respondents from the Sydney region and, fewer participating in riskier offshore water activities and belonging to an ocean experience community club).

Similar to Wave 1, NSW/ACT residents* and Beachgoers are the most confident (3.2 and 3.4 respectively out of 5) in shark mitigation measures used in their local area. This is followed by Councils (3.0), Opt-in individuals (2.9) and other Organisations (2.7).

Despite a slight improvement in the familiarity of newer shark mitigation technologies among NSW/ACT residents compared to wave 1, the lack of improvement in the overall confidence score indicates that further education is required.

Drone surveillance maintains high satisfaction and high perceptions of safety

As per wave 1, drone surveillance continues to generate higher satisfaction and better perception of safety across all cohorts with 78% to 86% mentioning being satisfied/very satisfied and 22% to 54% claiming to feel very/extremely safe.

Indeed, there is a correlation between satisfaction and perception of safety. Therefore, by tackling reasons for dissatisfaction, the NSW government can potentially improve satisfaction and the community's perceptions of safety.

Spontaneous feedback from dissatisfied participants reveals that by expanding the deployment of drones, satisfaction and perceptions of the overall effectiveness of these measures may see an uplift.

As seen during the first wave of the research, community satisfaction with shark mitigation technologies is driven by mutualistic attitudes

NSW/ACT residents are most satisfied with less 'invasive' measures such as drone surveillance (78%), tagged shark listening stations (67%) and SMART drumlines (64%), and least satisfied with shark nets (48%).

This is driven by mutualistic attitudes, that is to say, the willingness, among NSW/ACT residents, to minimise harm towards sharks and other marine species, and ensure sharks exist in the future. As per wave 1, unprompted feedback from opponents of shark nets, and to a lesser extent SMART drumlines, reveal a deep-seated concern about the harm to sharks and non-target species caught in shark nets or baits. SMART drumlines could become controversial similar to shark nets - potentially harming all marine species.

To overcome community perceptions about the potential harm to marine wildlife caused by SMART drumlines, it would be valuable to communicate its limited impact.

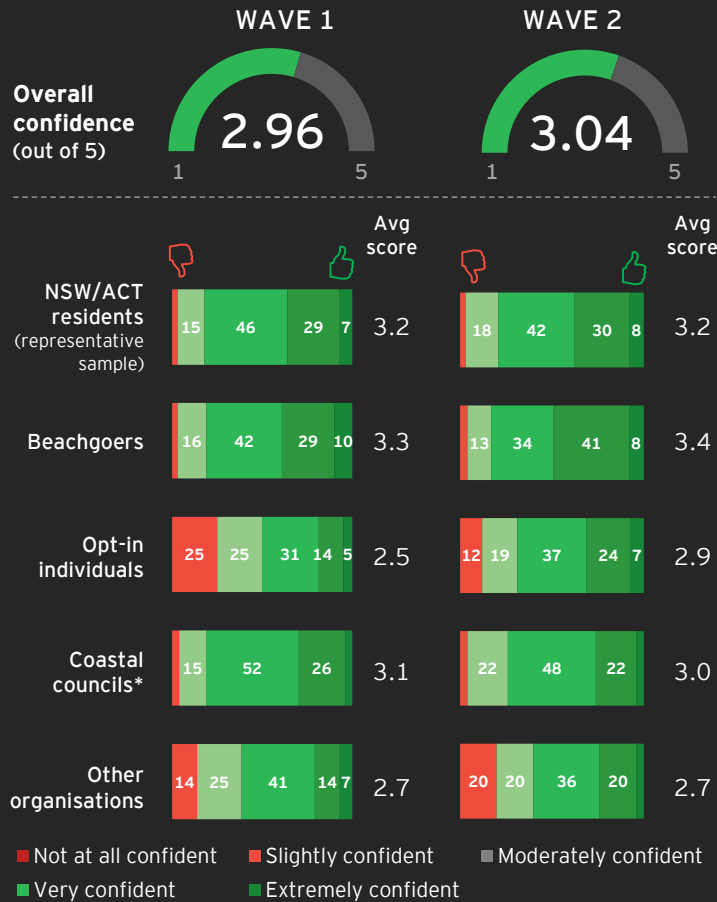
There is an opportunity for the NSW government to further build confidence in the Shark Management Program by reviewing deployment plans of measures such as drones and shark listening stations, and enhance communication around safety benefits offered by the measures deployed.

Five key areas will be further explored in this report...

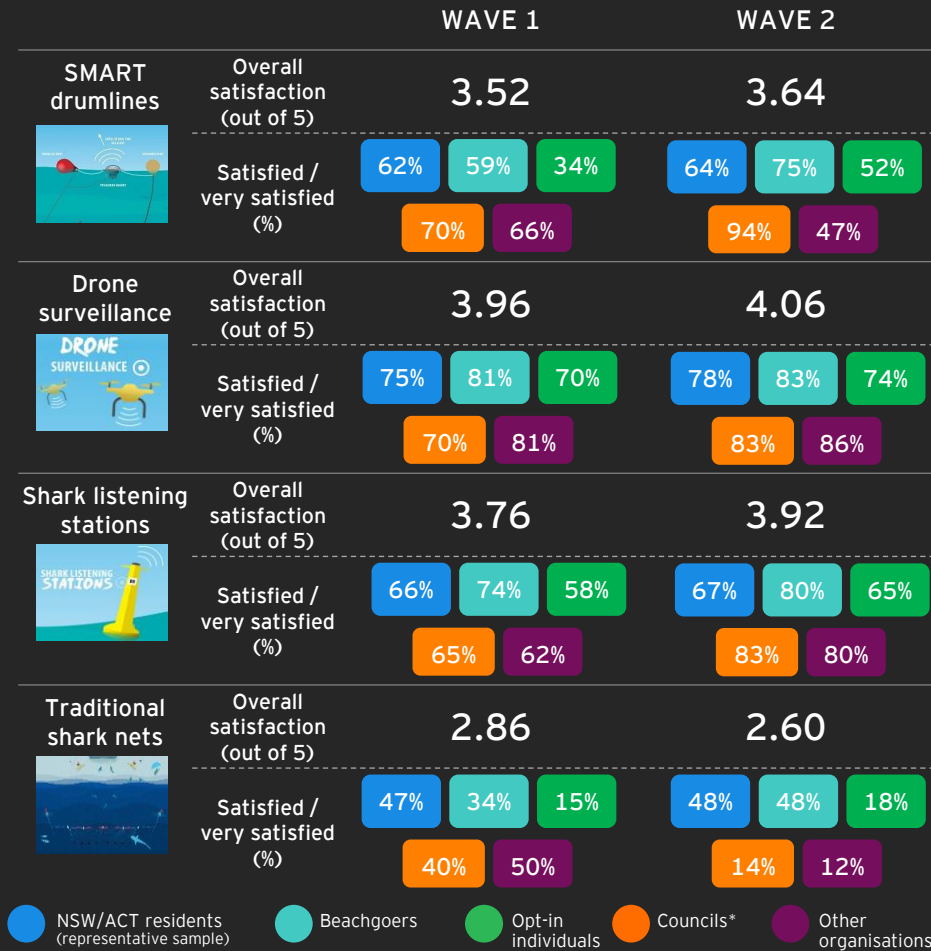
- 1 Beach usage
- 2 Shark concerns and perception
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- 5 Safety perception and confidence with shark mitigation measures

Summary of key indicators - Wave 1 and Wave 2

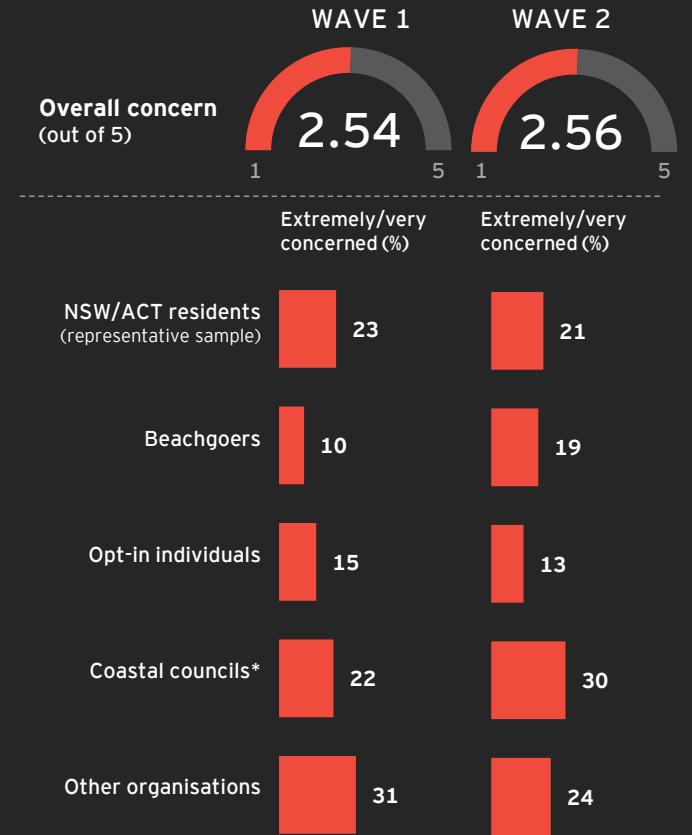
OVERALL CONFIDENCE



SATISFACTION WITH MITIGATION MEASURE



CONCERN ABOUT THE RISK OF ENCOUNTERING SHARKS



Source: Q15. Overall, how confident are you that the current mix of shark mitigation technologies used in your local council/government area increases the protection of beachgoers at ocean beaches?
 Base: Wave 1 NSW/ACT residents, n=500; Wave 1 Beachgoers, n=363; Wave 1 Opt-in Individuals, n=1,812; Wave 1 Council, n=27, Wave 1 Organisations, n=59, Wave 2 NSW/ACT residents, n=500, Wave 2 Beachgoers, n=336; Wave 2 Opt-in Individuals, n=2,651; Wave 2 Councils, n=23; Wave 2 Organisations, n=50.

Source: Q11. To what extent are you satisfied or dissatisfied with the use of the following shark mitigation technologies at beaches in your local council/government area/NSW to increase the protection of beachgoers/ocean water users?
 Base: Wave 1 NSW/ACT residents, n=429 to 500; Wave 1 Beachgoers, n=286 to 363; Wave 1 Opt-in Individuals, n=1,178 to 1,812; Wave 1 Council, n=10 to 27, Wave 1 Organisations, n=36 to 59, Wave 2 NSW/ACT residents, n=425 to 500, Wave 2 Beachgoers, n=270 to 336; Wave 2 Opt-in individuals, n=2,270 to 2,651; Wave 2 Councils, n=7 to 24; Wave 2 Organisations, n=41 to 50.

Note: Councils and Organisations that answered "Don't know/Unsure" have been excluded from the calculation of the Overall Concern score.
 Source: Q4/Q5/Q6. How concerned are you personally/the council/your organisation about the risk of (the community/your members) encountering sharks at NSW ocean beaches?
 Base: Wave 1 NSW/ACT residents, n=500; Wave 1 Beachgoers, n=363; Wave 1 Opt-in Individuals, n=1,812; Wave 1 Council, n=27, Wave 1 Organisations, n=59, Wave 2 NSW/ACT residents, n=500, Wave 2 Beachgoers, n=336; Wave 2 Opt-in individuals, n=2,651; Wave 2 Councils, n=23; Wave 2 Organisations, n=50.

Beach usage



Majority of NSW/ACT residents and Beachgoers engage in generally safe activities at ocean beaches

- ▶ **Majority of individuals undertake safe water and land beach activities...** such as swimming near shore (75% among NSW/ACT residents, 65% among Beachgoers, 79% among Opt-in Individuals), sunbathing/relaxing (64% among NSW/ACT residents and Beachgoers, 50% among Opt-in Individuals) and walking/dog walking/exercise by the beach (76% among Opt-in Individuals).
- ▶ **2 in 5 NSW/ACT residents (39%) and Beachgoers (44%) undertake water activities that take them further away from the shore...** and are therefore potentially more likely to encounter a shark. These water activities include...

- Surfing/body boarding/body surfing (20% and 24% among NSW/ACT residents and Beachgoers respectively)

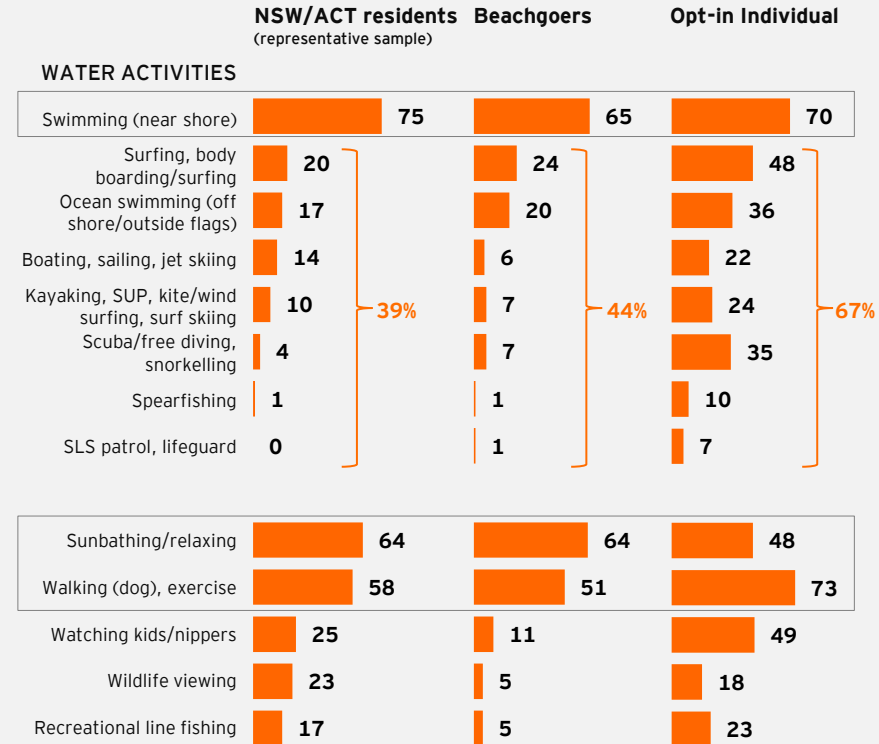
- Ocean swimming (17% and 20% respectively)
- Boating, sailing, jet skiing (14% and 6% respectively)
- Kayaking, stand-up paddle boarding, canoeing, kite surfing, wind surfing, surf skiing (10% and 7% respectively)
- Scuba diving, snorkelling, free diving (4% and 7% respectively)
- Spearfishing (1% and 1% respectively)

- ▶ **Participation in offshore water activities is higher among Opt-in individuals...** with 2 in 3 (67%) participating in water activities such as ocean swimming and surfing/body boarding that take them further away from the shore.

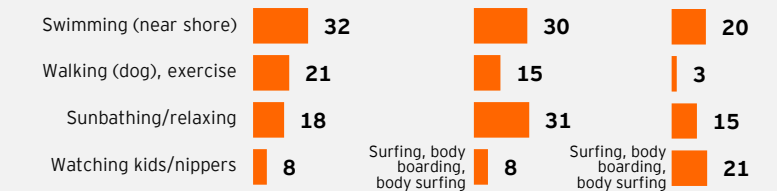
Comparison to Wave 1

As per Wave 1, Opt-in Individuals are more likely to participate in potentially riskier water activities compared to NSW/ACT residents and Beachgoers. However, the proportion of Opt-in Individuals participating in these activities declined significantly in Wave 2 (from 82% in Wave 1 to 67% in Wave 1). This change in the composition of the Opt-in individual sample is likely to have an impact on sentiments towards shark mitigation measures.

Activities undertaken at NSW ocean beaches (%)



Main activity undertaken at NSW ocean beaches (%)



Q2. What are the main activities you do when at ocean beaches in NSW? Please select all that apply. Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651
 Q3. And what is the main activity you do when at ocean beaches in NSW? Please select one response only. Base: All NSW/ACT residents, n=452; Beachgoers, n=278; Opt-in Individual, n= 2,534
 Note: SUP = Stand-Up Paddle boarding

Shark concerns and perceptions



Overall, the level of concern about the risk of encountering sharks is relatively low

- ▶ **Overall, NSW/ACT residents do not perceive sharks as a high risk to their safety...** with 4 in 5 (79%) not at all/slightly/moderately concerned about the risk of encountering sharks. This perception is fairly consistent across regions, age, and gender.
- ▶ **However, the concern about the risk of encountering sharks increases among NSW/ACT residents who...**
 - **Reside in non-coastal council areas...**with 23% of those living in non-coastal NSW areas being extremely/very concerned (vs. 17% of those living in coastal areas).
 - **Live between 11 to 30km of the coast...** with 27% being extremely/very concerned (vs. 18% of those living less than 10km from the coast and 20% of those living more than 30km from the coast).

- **Have children at home...** with 24% of residents with children being extremely/very concerned about the risk of encountering sharks (vs. 18% of residents with no children).
- **Visit frequently NSW ocean beaches during the summer months...** with 30% of those who visit the coast everyday/several times a week being concerned about their safety (vs. 17% of those who visit less than once a month).

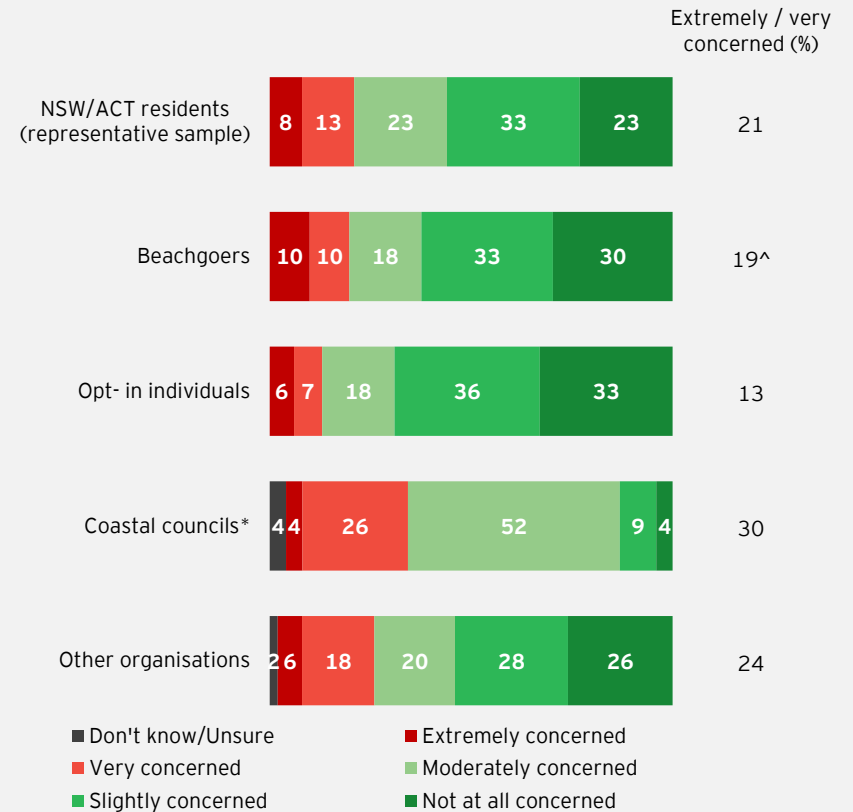
- ▶ **Compared to the other cohorts, Beachgoers and Opt-in individuals had a lower level of concern while Councils and Organisations had a higher level of concern...** with 13-19% of Individuals and 24-30% of Councils and Organisations being extremely/very concerned of the risk of encountering sharks. This trend is similar to Wave 1.

Comparison to Wave 1

The level of concern about the risk of encountering sharks has...

- ▶ **Increased among Councils and Beachgoers...** the level of concern increased marginally from 22% to 30% among Councils, and significantly from 10% to 19% among Beachgoers. Increase in concern among Beachgoers is driven by significantly higher concern in Lake Macquarie and Newcastle. This could be due to shark sightings or incidents.
- ▶ **Declined marginally...** for NSW/ACT residents, Opt-in individuals and Organisations.

Concern about the risk of encountering sharks at NSW ocean beaches (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=23; Other organisations, n=50

*Note, the data is indicative as the sample size is small for this cohort Q4/Q5/Q6. How concerned are you personally/the council/your organisation about the risk of (the community/your members) encountering sharks at NSW ocean beaches?

^Difference between total and sum of components are due to rounding

Coexistence with sharks is important but so is the protection and patrolling of the ocean for human recreation

- ▶ **NSW/ACT residents are overwhelmingly mutualist in their attitudes towards sharks...** 9 in 10 (88%) say that sharks are important for healthy marine ecosystems and that it is important to ensure sharks exist in the future. 4 in 5 also believe that sharks should be protected (81%) and there should be coexistence between humans and sharks (80%).
- ▶ **This mutualist attitude is consistent across cohorts...** with high proportions agreeing to the mutualist statements (94%-97% of Beachgoers, 89%-94% of Opt-in individuals, 83%-96% of Councils and 92%-96% of Other organisations agree).
- ▶ **On the other hand, domination attitudes are less prevalent with the exception of protecting and patrolling the nearshore strip of the ocean for human recreation and tourism...** indeed, 78% of NSW/ACT residents and Councils, 85% of Beachgoers and 68% of Organisations agree there is a need to protect and patrol the nearshore strip of the ocean for business purpose.

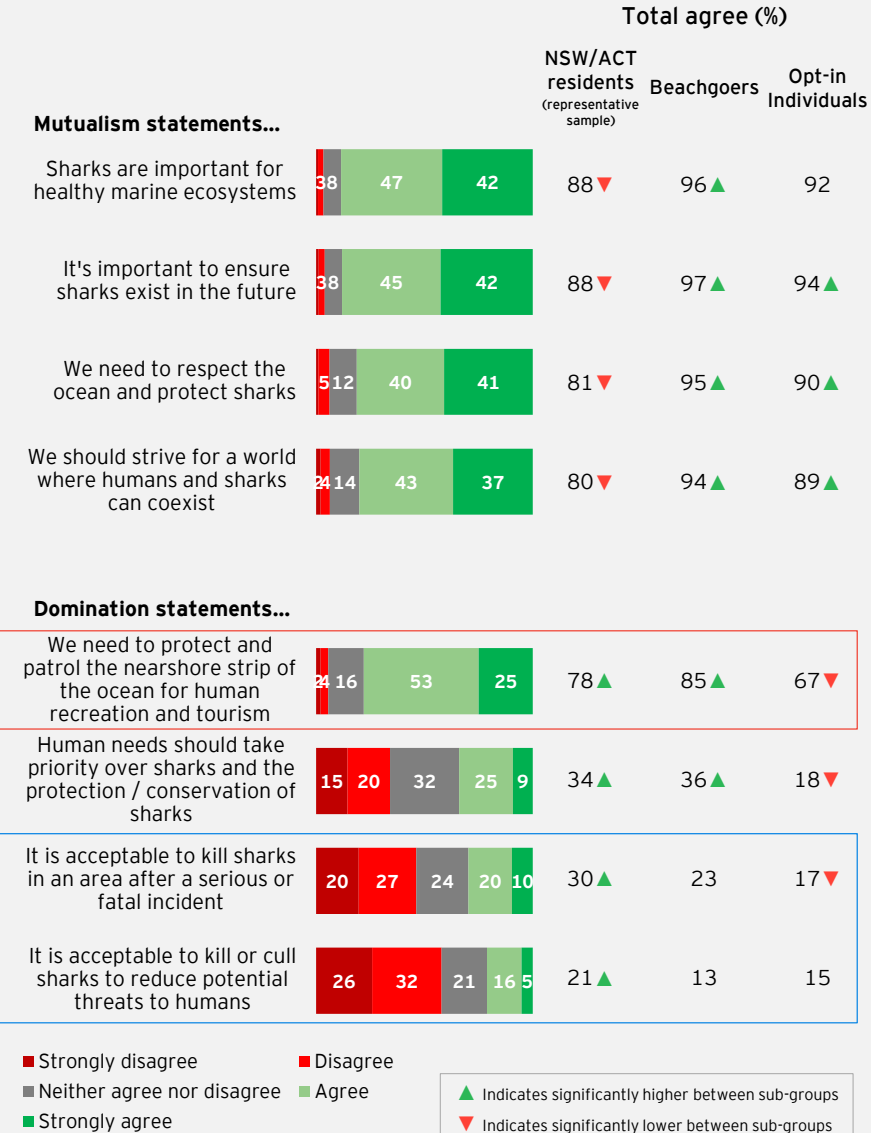
Comparison to Wave 1

Attitudes around the need to protect and patrol the nearshore strip of the ocean have increased significantly among Beachgoers (from 77% to 85%) and Opt-in Individuals (from 56% to 67%). This is likely due to the larger proportion of Beachgoers who are interstate/overseas visitors and lower proportion of Opt-in individuals who belong to an ocean experience community club.

- ▶ **Acceptability of killing sharks for human protection is more prevalent among those who are concerned about the risk of encountering sharks...**
 - 40% of NSW/ACT residents agree that it is acceptable to kill sharks in an area after a serious or fatal incidence (vs. 27% among those who show less concern).
 - 33% of NSW/ACT residents agree that it is acceptable to kill/cull sharks to reduce potential threats to humans (vs. 21% among those who show less concern).

| Domination statements (Total agree %) | Extremely / Very concerned about the risk of encountering sharks | Moderately / Slightly / Not at all concerned | NET: NSW/ACT residents (representative sample) |
|---|--|--|--|
| It is acceptable to kill sharks in an area after a serious or fatal incident | 40▲ | 27 | 30 |
| It is acceptable to kill or cull sharks to reduce potential threats to humans | 33▲ | 18 | 21 |

Perception of sharks (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n=2,651
 Q7/Q8. Below is a selection of statements some people have used when describing their perception of sharks. Please indicate to what extent you/your organisation/council agree or disagree with the following statements.

Awareness and familiarity with shark mitigation measures



NSW/ACT residents are less knowledgeable about the use of newer technologies (SMART drumlines and shark listening stations) in their local area compared to traditional shark nets and drones

► **Knowledge about the presence or absence of SMART drumlines and shark listening stations in their local council area / NSW tends to be lower compared to shark nets and drone surveillance with..**

- More than 1 in 2 NSW/ACT resident (52-54%) and Beachgoers (52-62%) indicate they 'don't know' if these newer technologies are used, compared to 1 in 4 for shark nets (18% among NSW/ACT residents and 24% among Beachgoers).
- The correctness of their knowledge is also lower for newer mitigation technologies compared to shark nets and drone surveillance, with only a third of NSW/ACT residents (37%) and Beachgoers (38%) correctly identifying if SMART drumlines are used/not used in their local area. In contrast, the proportion of correct responses sit between 62-68% for shark nets and drone surveillance.

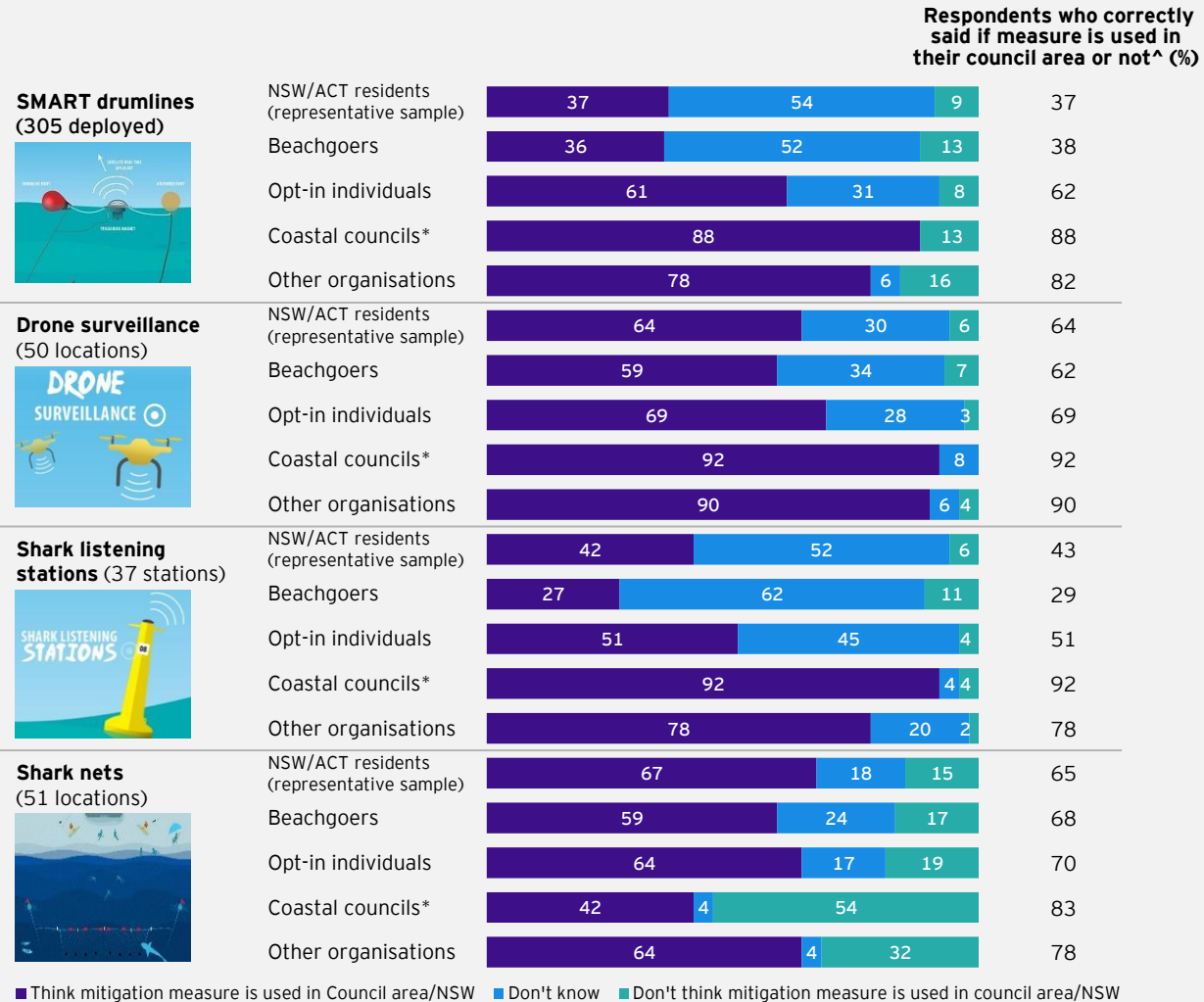
► **Knowledge about the mitigation measures deployed in NSW is higher among...**

- **Opt-in individuals...** 51-70% providing a correct response about the technology used in their council area compared to 37-65% among NSW/ACT residents and 29-68% among Beachgoers. This is likely a reflection of the higher engagement in ocean activities among Opt-in Individuals compared to other individual cohorts.
- **Councils and Organisations...** 83-92% of Councils and 78-90% of Organisations correctly select the technology used.

Comparison to Wave 1

Knowledge of shark mitigation technologies used in their local council area / NSW has marginally increased among NSW/ACT residents... in particular, knowledge of the newer technologies increased in Wave 2, with 13% more NSW/ACT residents correctly identifying if shark listening stations are used in their local area compared to Wave 1 (43% vs 30%), and 2% more NSW/ACT residents correctly identifying if SMART drumlines are used (37% vs 35%). This improvement is probably the result of the deployment of mitigation methods across NSW ocean beaches and the educational effort undertaken by DPI and Councils.

Knowledge of shark mitigation measures currently used in council area / NSW (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50
 Q9. Which of the following shark mitigation measures are currently used in your council area / NSW to increase protection of beachgoers?
 ^ For example, if shark net was used in respondent's area and respondent said they think it is used, respondent is correct. If shark net is not used in respondent's area and respondent said they do not think it is used, respondent is also correct. Interstate/Overseas respondents are excluded

Familiarity with newer technologies has increased among NSW/ACT residents but there is still room for improvement

- ▶ **Due to the lower reach of newer technologies, the representative sample of NSW/ACT residents are less familiar with SMART drumlines and shark listening stations compared to traditional shark nets and drones...** with 31-32% NSW/ACT residents saying they know a great deal/a lot/a little about SMART drumlines and shark listening stations, compared to 57-83% saying they know of drone surveillance and shark nets.
- ▶ **Familiarity among the NSW/ACT resident cohort increases among...**
 - **Members of a community club/group...** with 59% of members being familiar with SMART drumlines vs. 25% among non-members.
 - **Frequent NSW ocean beaches visitors...** with 45% of residents who visit the beach several times a week in summer saying they are familiar with SMART drumlines vs. 20% among those who visit the beach

less than once a month. This trend is consistent across all shark mitigation technologies.

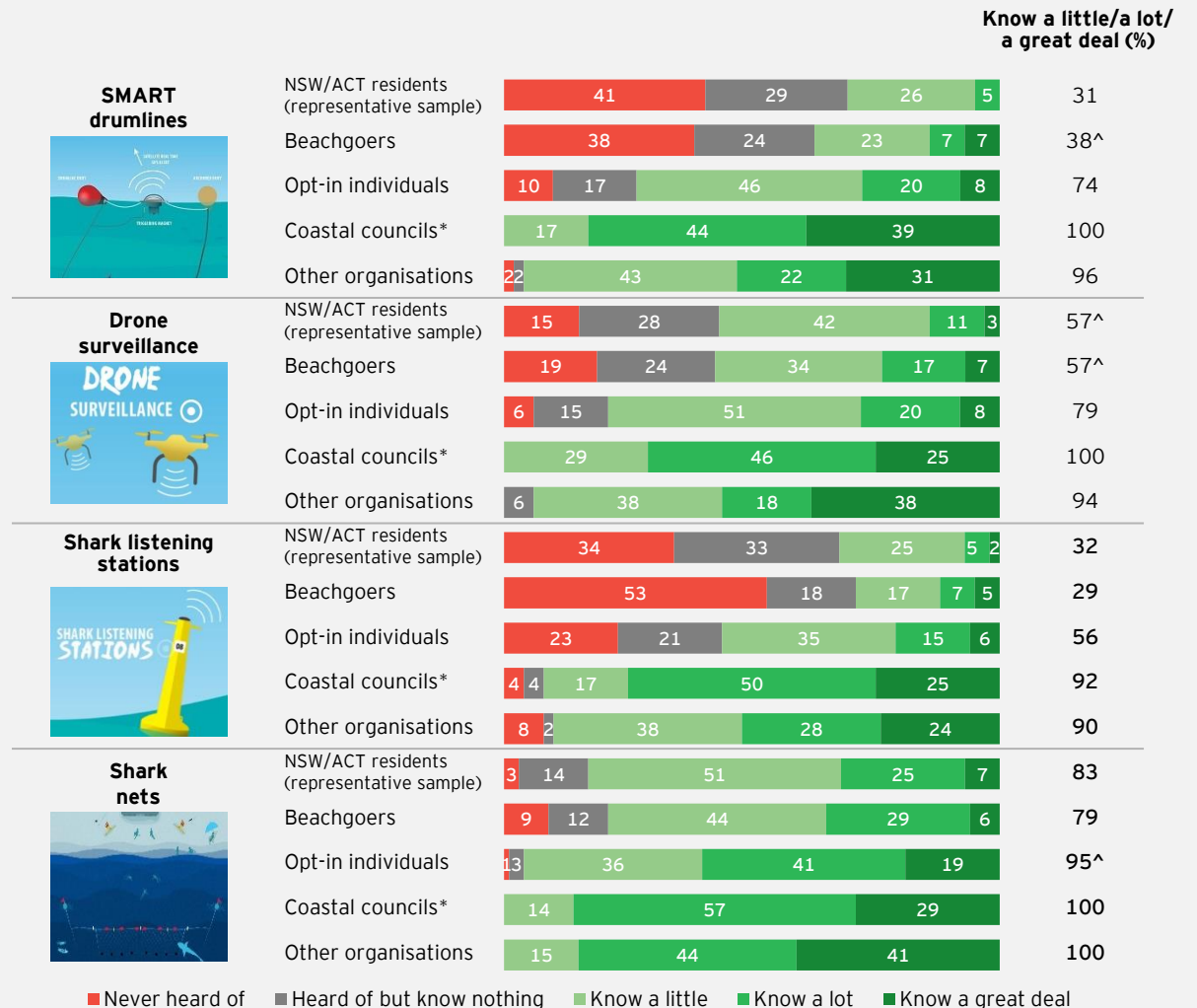
- ▶ **Beachgoers and NSW/ACT residents have a similar level of familiarity with shark mitigation technologies, whilst Opt-in individuals tend to be more familiar...** with 56-95% of Opt-in individuals knowing a great deal/a lot/a little compared to 31-83% of NSW/ACT residents and 29-79% of Beachgoers. This is expected as Opt-in individuals, who voluntarily participated in the survey, are more likely to be engaged with the topic than Beachgoers and the representative sample of NSW/ACT residents.
- ▶ **Familiarity with all shark mitigation technologies is high among Coastal councils and stakeholder groups...** with nearly 9 in 10 Councils (92-100%) and ocean experience organisations (90-100%) saying they know a great deal/a lot/a little.

Comparison to Wave 1

Familiarity with all shark mitigation technologies has declined among Beachgoers and Opt-in Individuals... Specifically, familiarity with SMART drumlines has declined from 43% to 38% among Beachgoers and from 83% to 74% among Opt-in Individuals. Familiarity with Shark listening stations also dropped from 35% to 29% among Beachgoers and from 64% to 56% among Opt-in Individuals.

- ▶ This decline in familiarity could be due to a higher proportion of overseas/interstate visitors in the Beachgoers cohort (10% vs. 19%) and a lower proportion of club members in the Opt-in individuals cohort (52% vs. 47%).

Familiarity with shark mitigation technologies used in the SMP (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50

*Note, the data is indicative as the sample size is small for this cohort

Q10. To what extent are you familiar with how the following shark mitigation technologies, used at ocean beaches in your local council / government area / ocean beaches in NSW, operate to increase protection of beachgoers/ocean water users?

[^]Difference between total and sum of components are due to rounding

Satisfaction with shark mitigation measures



Satisfaction with 'passive' measures (drone surveillance and shark listening stations) improved from Wave 1 and remains stronger than more invasive measures (shark nets)

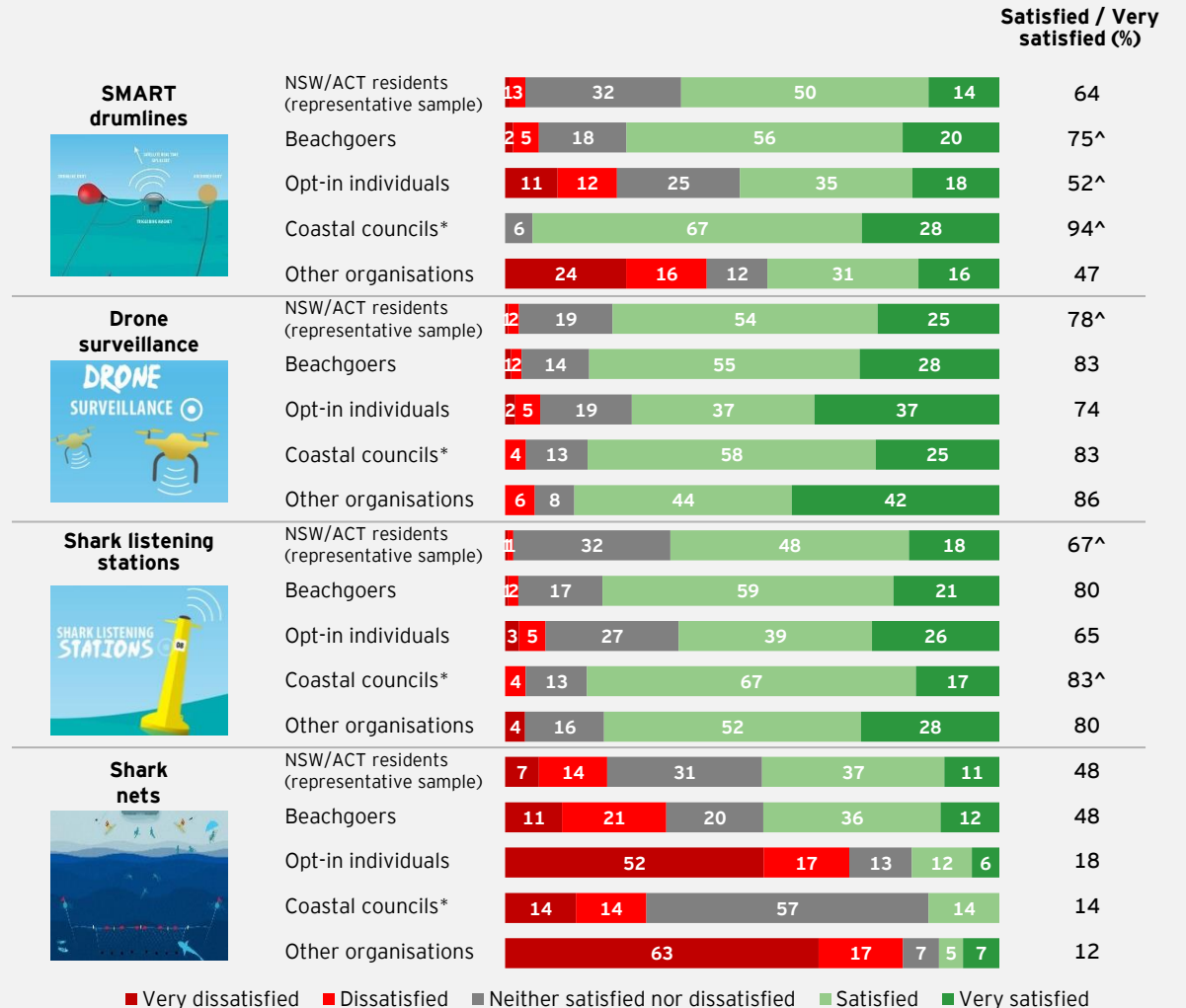
- ▶ **Drone surveillance is the measure that holds the highest satisfaction across all cohorts...** with more than 3 in 4 NSW/ACT residents (78%), Beachgoers (83%), Opt-in Individuals (74%) and Organisations (86%) being very satisfied/satisfied with this measure.
- ▶ **This is followed by Shark listening stations and SMART drumlines...** with satisfaction ranging from 65-83% for shark listening stations and from 47-94% for SMART drumlines.
- ▶ **Shark nets generate the lowest satisfaction level...** with satisfaction ranging from 12% for other organisations to 48% for NSW/ACT residents.

Comparison to Wave 1

This follows a similar trend observed in Wave 1... where satisfaction with drone surveillance was the highest, followed by shark listening stations, SMART drumlines and shark nets. As per Wave 1, Opt-in individuals and stakeholder groups are also relatively more dissatisfied with shark nets. This is expected as these respondents voluntarily participated in the survey and therefore, are more likely to have a more extreme positive or negative opinion.

Interestingly, while satisfaction with SMART drumlines remains lower among Opt-in Individuals compared to the other cohorts, it has improved since Wave 1... with satisfaction increasing significantly from 34% to 52% in Wave 2. This is likely due to the change in the sample composition of this cohort, with more individuals from Sydney (23% to 47%) and less from the other regions (for instance, 14% to 4% in North Coast, 11% to 5% in Mid-North Coast).

Satisfaction with shark mitigation technologies (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50

*Note, the data is indicative as the sample size is small for this cohort

Q11. To what extent are you satisfied or dissatisfied with the use of the following shark mitigation technologies at beaches in your local council/government/in NSW area to increase the protection of beachgoers/ocean water users?

[^]Difference between total and sum of components are due to rounding

Concern about the harm to wildlife continues to be the main reason why shark nets and SMART drumlines are opposed

- ▶ **The harm to sharks and other marine species is the main reason why opponents are dissatisfied with shark nets and SMART drumlines with..**
 - 58% of those dissatisfied with shark nets and 45% of those dissatisfied with SMART drumlines being concerned with the harm to sharks and other non-target marine life.
 - This is expected given the strong mutualistic sentiment among the NSW/ACT residents, Beachgoers and Opt-in Individuals - with more than 4 in 5 agreeing that sharks are important for healthy marine ecosystems (88-96%) and that we need to respect the ocean and protect sharks (81-95%).
- ▶ **The perceived lack of effectiveness of SMART drumlines and shark nets is also a key reason for dissatisfaction with...**
 - 16% believing that the baiting of sharks with SMART drumlines may have the unintended effect of attracting more sharks to the shoreline.
 - 14% mentioning that small marine animals caught in a shark net may unintentionally attract sharks to the area.

Comparison to Wave 1

The top two reasons for dissatisfaction with SMART drumlines and shark nets remain consistent with Wave 1... suggesting that perceptions around the harm to marine life and the effectiveness of the measures remain deep-seated.

Further communication on the effectiveness of SMART drumlines and the potential impact on marine species could help overcome this perception.

“

The baits have been known to attract sharks, not deter. I (have) first hand footage of contractors abusing the sharks and the sharks dying before being released

Dissatisfied with SMART drumlines,
Opt-in individual, Male, 35-44, Northern Beaches

“

Indiscriminate killing of sharks and many other marine animals is disproportionate to the risk to humans.

Dissatisfied with Shark nets,
Surf Life Saving Club,
Wollongong City Council

“

Doesn't seem humane. Even limited time on the line is not good for the shark.

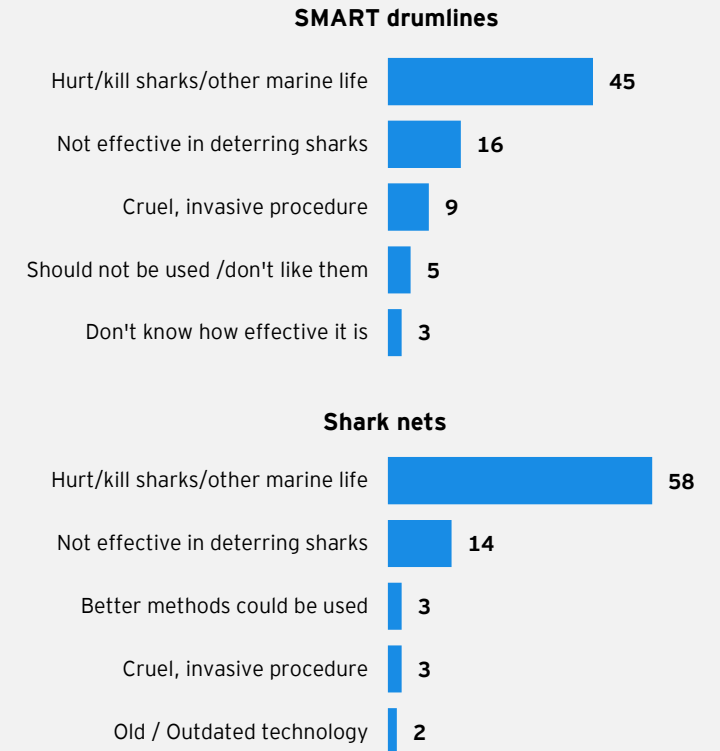
Dissatisfied with SMART drumlines,
NSW/ACT resident, Female, 18-34, Far West, Central West and Orana, Non-coastal NSW LGA

“

They kill animals, including the sharks. The sharks can also just swim around them.

Dissatisfied with shark nets,
Beachgoer, Female, 45-54, Sydney CBD/Eastern suburbs/Inner West,
Non-coastal NSW LGA

Top reasons for dissatisfaction with SMART drumlines and shark nets (%)



Base: Dissatisfied with SMART Drumlines (coded), n=291; Dissatisfied with shark nets (coded), n=508
Please note that the total number of responses coded here is not the total number of respondents dissatisfied with the measure as a random selection of Opt-in individuals' response was applied here for coding. Total may not add to 100% as Others/Don't know/Nil response is not shown
Q12. Why are you dissatisfied with the use of SMART drumlines/drone surveillance/shark listening stations/shark nets?

Increasing deployment and/or communication around deployment of shark listening stations and drone surveillance may raise satisfaction levels

▶ Limited deployment of drone surveillance and shark listening stations is the main reason for dissatisfaction....

- With 1 in 2 (49%) of those dissatisfied with drones and 1 in 5 (19%) of those dissatisfied with shark listening stations saying that more of such measures are needed.
- This means that respondents are not against these mitigation measures.

▶ These less invasive measures also generate some concerns around their effectiveness, which could be addressed if deployment increases...

- With 7% of those dissatisfied with drone surveillance being concerned that this measure may not be completely effective in reducing human-shark interactions unless more beaches/sharks are monitored.
- Similarly, 8% of those dissatisfied with shark listening stations are concerned with their effectiveness to deter sharks from coming near the shoreline and 9% outline that this measure only works if all sharks are tagged. Increasing shark tagging and a wider deployment of shark listening stations could potentially improve satisfaction with this technology.

Comparison to Wave 1

These findings are similar to Wave 1... indicating that with broader deployment, as well as wider communications around choice of locations and schedule of deployment, concerns with these two measures could be alleviated.

“

'Cos I never really see them or hear anything about them when just out and about down near the water... **clearly not being used enough.**

Dissatisfied with Drone surveillance,
NSW/ACT resident, Male, 45-54, Sydney CBD/Eastern suburbs/Inner West,
Non-coastal NSW LGA

“

Waste of money and time - **the number of sharks tagged is minimal** and I suspect there is **minimum detection of tagged sharks.**

Dissatisfied with Shark listening stations,
Opt-in individual, Male, 55-64,
City of Newcastle Council

“

We need more.

Dissatisfied with Shark listening stations,
Beachgoer, Male, 35-44, Port Macquarie

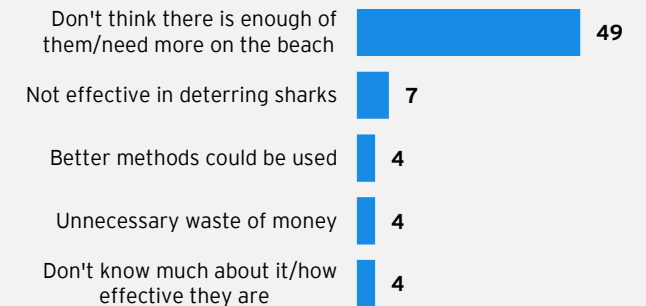
“

Drone usage within LGA limited due to availability of equipment and trained pilots so limited application.

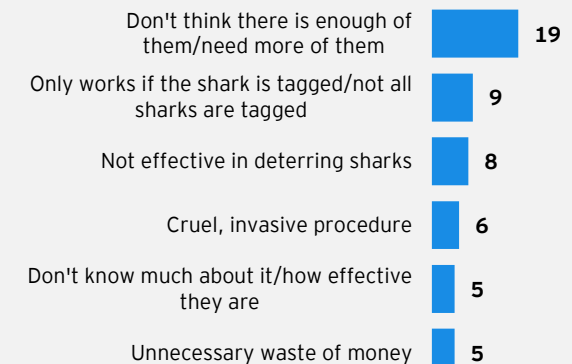
Dissatisfied with Drone surveillance,
Tweed Shire Council

Top reasons for dissatisfaction with Drone surveillance and Shark listening stations (%)

Drone surveillance



Shark listening stations



Safety perception and confidence with shark mitigation measures



Newer technologies continue to provide a higher perception of safety than shark nets, with drone surveillance generating highest perception of safety

► **Perceptions of safety continue to mirror satisfaction levels...** with drone surveillance perceived to offer the greatest level of safety (48% of NSW/ACT residents feel very/extremely safe), followed by shark listening station (39%), SMART drumlines (38%) and shark nets (32%). This trend is consistent among Beachgoers, Opt-in Individuals and Coastal councils.

Comparison to Wave 1

The perception of safety related to SMART drumlines has increased... Among Opt-in individuals, participants who felt very/extremely safe increased from 15% to 31% and among Beachgoers, this increased from 37% to 48%. However, this need to be considered with caution as these cohorts are slightly different compared to Wave 1, with a higher proportion of overseas/interstate visitors included within the beachgoers cohort and less club members in the Opt-in individual cohort.

► **The proportion of respondents who say they feel 'moderately safe' with shark mitigation technologies remain relatively high across all measures and waves...** with nearly 1 in 2 NSW/ACT residents saying they feel 'moderately safe' with SMART drumlines (46%) and shark listening stations (45%), and 1 in 3 saying the

same for drone surveillance (39%) and shark nets (39%). A similar proportion of Beachgoers and Opt-in Individuals have also said the same for SMART drumlines, drone surveillance and shark listening stations - implying that there is still room to improve community perceptions of these shark mitigation technologies.

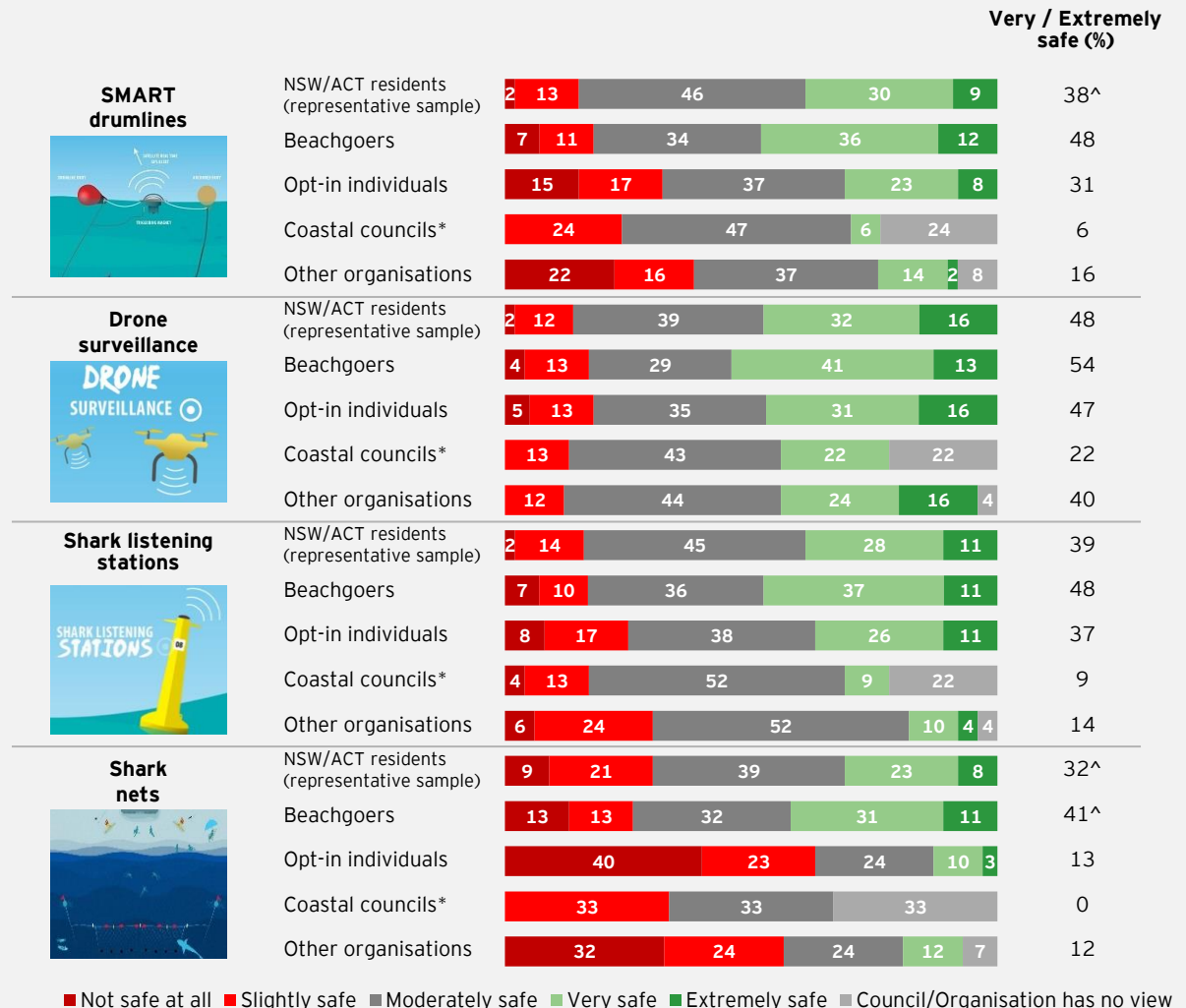
► **Councils and Organisations tend to underestimate the safety perceived from the community/beachgoers with the different shark mitigation technologies...**

- Indeed, while 6% of Councils and 16% of Organisations think that the community feel very/extremely safe knowing that SMART drumlines have been deployed at ocean beaches in their local areas, a larger proportion of NSW/ACT residents and beachgoers actually feel very/extremely safe (respectively 38% and 48%). This tendency is similar across all mitigation measures.

Comparison to Wave 1

This inclination by Councils and Organisations to underestimate safety perceived by the community was also present in Wave 1.

Perception of safety with shark mitigation technologies in LGA/NSW (%)



■ Not safe at all ■ Slightly safe ■ Moderately safe ■ Very safe ■ Extremely safe ■ Council/Organisation has no view

Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=23; Other organisations, n=50

*Note, the data is indicative as the sample size is small for this cohort

Q13. To what extent, do you/think the community/beachgoers feel safe, knowing that the following shark mitigation measures have been deployed at ocean beaches in your local council/government area/NSW?

[^]Difference between total and sum of components are due to rounding

The majority of the community and stakeholders feel more safe today with the new shark mitigation technologies than compared to five years ago

► Perception of feeling safer has increased for SMART drumlines, drone surveillance and shark listening stations compared to five years ago... with 3 in 5 NSW/ACT residents, Beachgoers and Opt-in Individuals feeling slightly/much safer compared to five years ago.

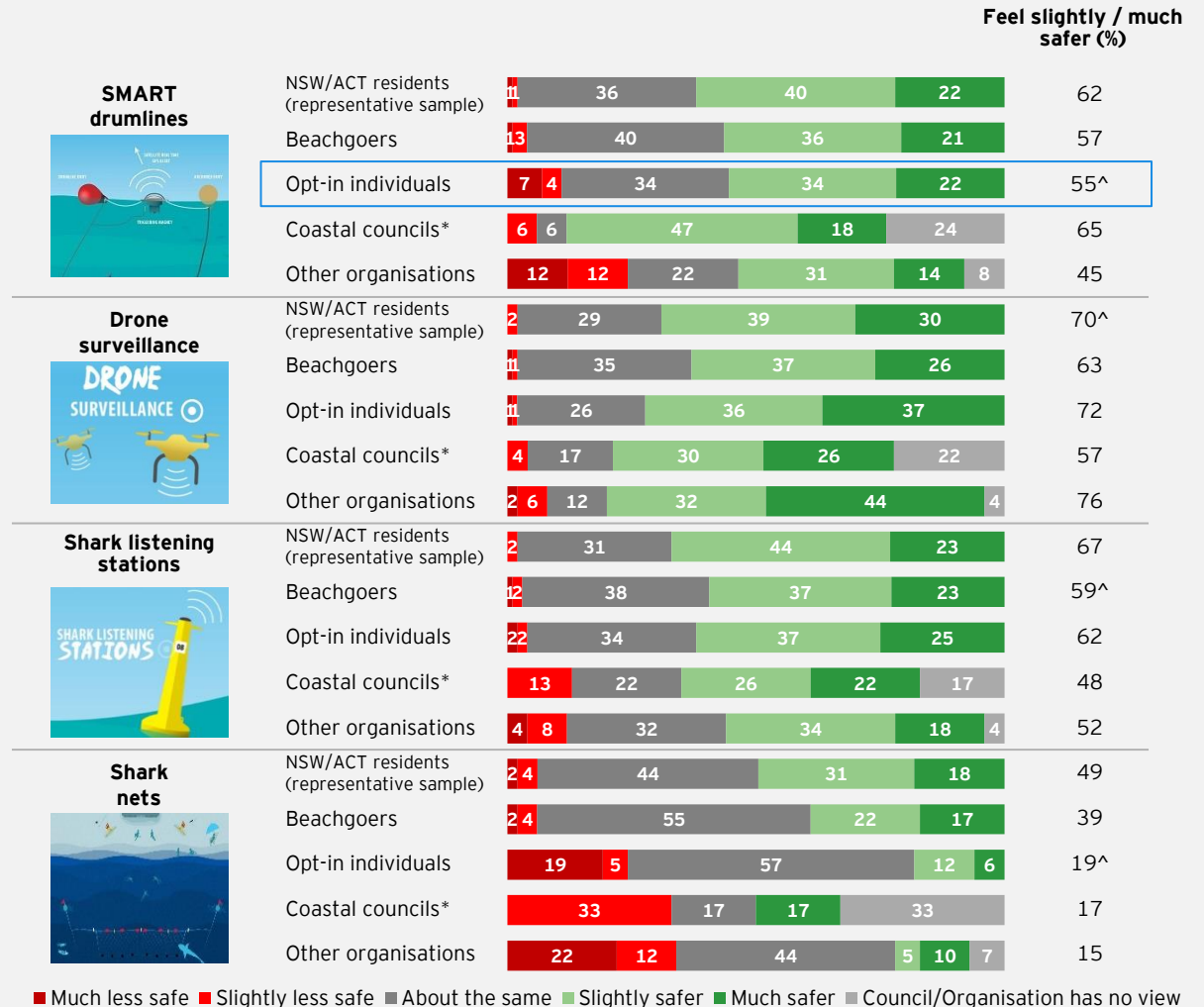
► In line with satisfaction, drone surveillance is perceived to offer the greatest increase in the level of safety compared to five years ago... among NSW/ACT residents (70% feel slightly/much safer), Beachgoers (63%), Opt-in Individuals (72%) and Organisations (76%). However, Councils think that SMART Drumlines offer the greatest increase in safety to the community (65% feel slightly/much safer with SMART drumlines compared to 57% for drone surveillance).

► The perception of feeling safer is lower with shark nets, compared to the other three technologies... whilst 49% of NSW/ACT residents and 39% of beachgoers feel safer with shark nets, 44% of NSW/ACT residents, 55% of Beachgoers and 57% of Opt-in Individuals mention that safety has remained 'about the same' with shark nets. This is expected as shark nets have been deployed along the NSW coast since 1937.

Comparison to Wave 1

The perception of increased safety across the different mitigation technologies and the different cohorts is similar to Wave 1, and significantly higher among Opt-in Individuals across all four measures... As mentioned previously, this is likely due to the change in the sample composition of this cohort.

Perception of increased safety with shark mitigation technologies (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=23; Other organisations, n=50

*Note, the data is indicative as the sample size is small for this cohort

Q14. To what extent, do you think the community/beachgoers feel safer or less safe knowing that the following shark mitigation measures have been deployed at ocean beaches in your local council/government area/NSW compared to 5 years ago?

^Difference between total and sum of components are due to rounding

Overall confidence with shark mitigation technologies used in NSW has improved slightly from 2.96 to 3.04 out of 5

- ▶ **Overall, between 24-49% of the community are confident (very or extremely) that shark mitigation technologies increase protection of beachgoers...** Across cohorts, Beachgoers expressed the highest confidence (3.4) in the shark mitigation technologies used, while Organisations (2.7) had the lowest confidence.

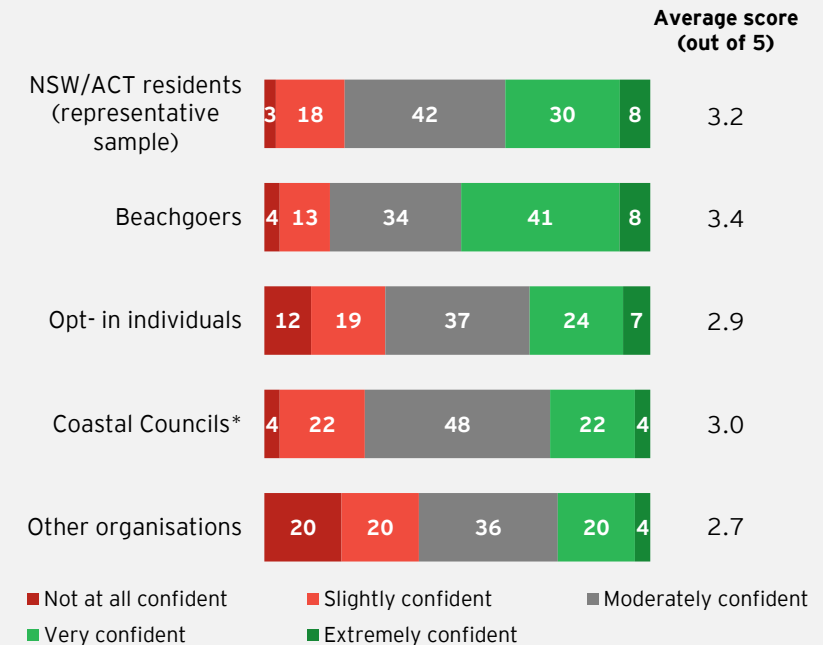
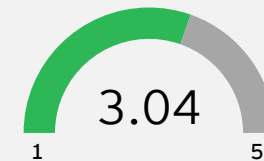
Comparison to Wave 1

Overall confidence in the current mix of shark mitigation technologies has increased from 2.96 to 3.04 out of 5... this increase is driven by higher confidence among Opt-in individuals, Beachgoers and Councils.

- ▶ **Opt-in Individuals:** average confidence score has increased significantly from 2.5 in Wave 1 to 2.9 in Wave 2.
- ▶ **Beachgoers and Councils:** marginal movement from 3.3 to 3.4 and 3.1 to 3.0 respectively from Wave 1 to 2.
- ▶ **NSW/ACT residents and Organisations:** the average confidence score has remained the same at 3.2 and 2.7 respectively in both waves.

Overall confidence in shark mitigation technologies used in local council area (%)

Overall confidence average score (out of 5)



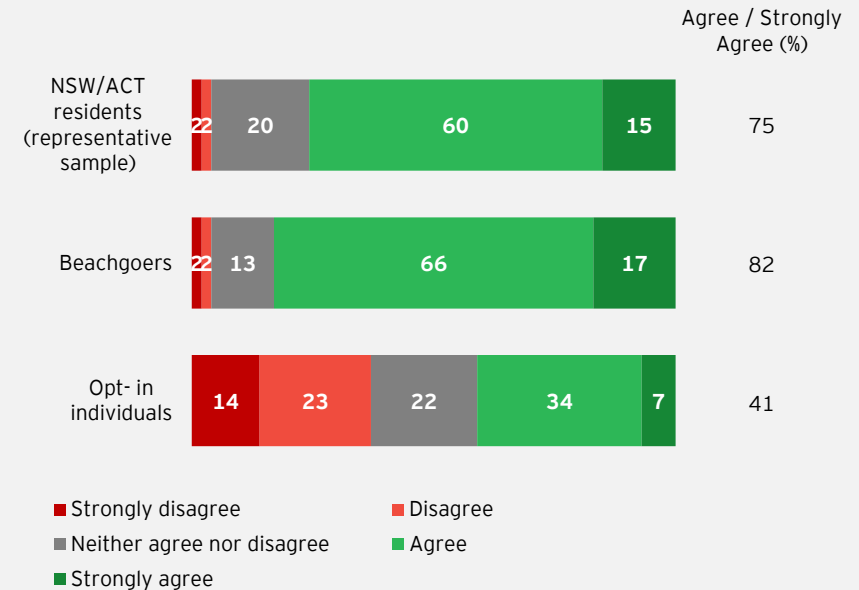
NSW/ACT residents and Beachgoers remain highly satisfied with the mix of technologies implemented at NSW ocean beaches

- ▶ **Satisfaction with the mix of technologies implemented by the Department is high among NSW/ACT residents and Beachgoers...** with 75% of NSW/ACT residents and 82% of beachgoers indicating that they agree/strongly agree to being satisfied with the technologies implemented by the Department to reduce the risk of human-shark interactions.
- ▶ **On the other hand, satisfaction with the mix of technologies implemented is lower among Opt-in Individuals...** with 41% of Opt-in individuals indicating that they agree/strongly agree (vs. 75-82% among NSW/ACT residents and Beachgoers).

Comparison to Wave 1

Overall satisfaction has remained the same for NSW/ACT residents, and increased significantly for Beachgoers and Opt-in individuals... As mentioned previously, this is likely due to the change in the sample composition of the two cohorts - a higher proportion of interstate/overseas visitors among the Beachgoers group and a higher proportion of individuals from the Sydney region in the Opt-in sample.

Overall satisfaction with mix of technologies implemented by DPI (%)



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n=2,651
 Q16. To what extent do you agree or disagree with the following statements? - Overall, I am satisfied with the technologies implemented by Department of Primary Industries (DPI) to reduce the risk of human-shark interactions at ocean beaches

Increasing public education on how to keep safe in the ocean and addressing concerns about the harm to marine life from shark nets may lift overall sentiment towards shark mitigation technologies

- ▶ **Spontaneous feedback among individuals reveals that the NSW/ACT residents and Beachgoers are in need of further communication...** as they find the survey informative (respectively 28% and 12%) and wish for more publicity (respectively 5% and 10%). Some Councils have also requested for more evidence on the benefits of the various shark mitigation measures to be shared. Additional communication on mitigation measures could lift overall understanding and sentiment towards shark mitigation measures at NSW ocean beaches.
- ▶ **Opt-in individuals, Councils and Organisations are concerned about the potential harm to the marine life through shark nets...** with 37% of individuals, 28% of Organisations and 20% of Councils indicating a desire for this measure to be removed or reduced. Alongside such requests is often a belief that marine wildlife is important - a sentiment shared across these 3 cohorts.
- ▶ **Other feedback received from all cohorts include expanding locations and operating hours of newer technologies (drones, drumlines and tagging stations).**

“
Remove the shark nets. There is no scientific evidence to show they are effective, in fact shows how ineffective they are. They **unnecessarily kill more non-target species than targeted sharks.** Tax payer money needs to go on **other forms of mitigation and education...**

Opt-in individual, Female, 55-64, Central Coast

“
 ... Ongoing education and engagement of coastal communities on the range of mitigation strategies being deployed... **Additional research and information on relative benefits to risk of various strategies, and of costings of those strategies, would be welcomed by Council...**

Northern Beaches Council

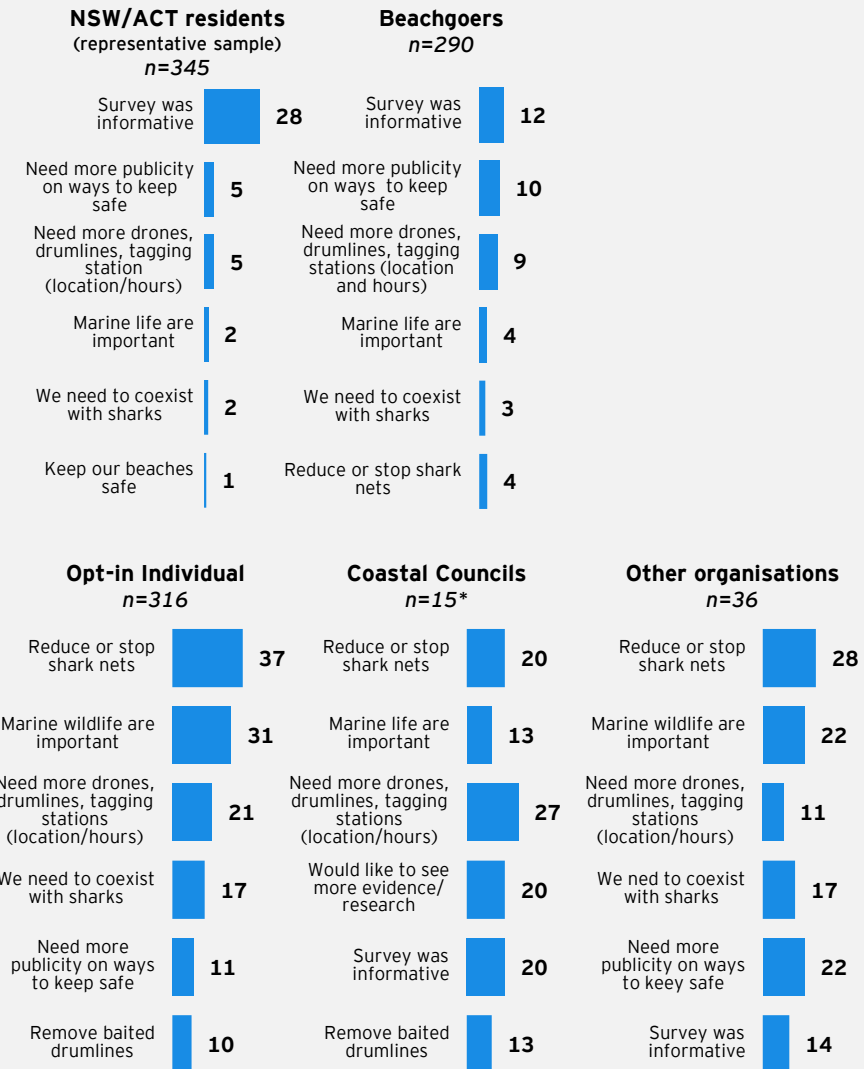
“
More drone patrols. Education that **teaches people to safe ocean use,** with more reference to swimming safety than shark safety.

Spearfishing Club, Central Coast

“
 I believe there should be **more physical and interactive education initiatives with children from preschool age all the way through to young adulthood.**

NSW/ACT resident, Female, 18-34, Western Sydney, Non-coastal NSW LGA

Top 6 final comments/suggestions on shark mitigation measures (%)



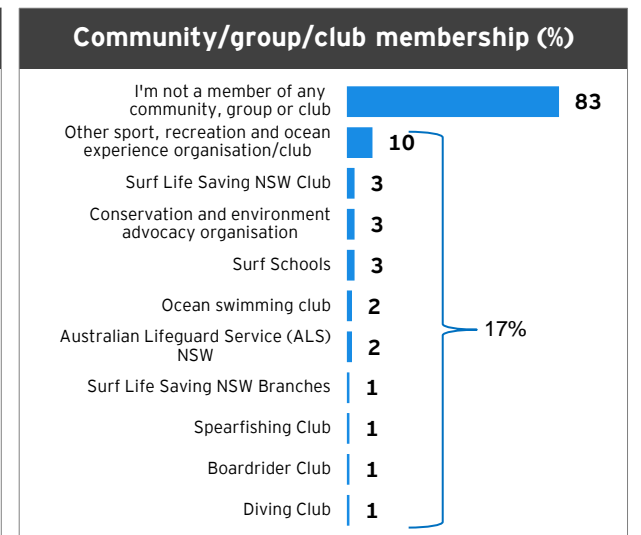
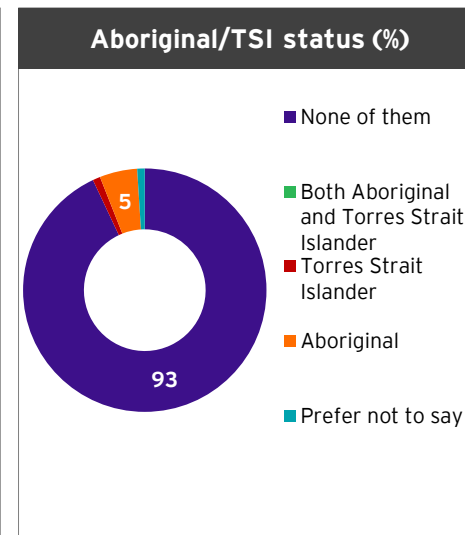
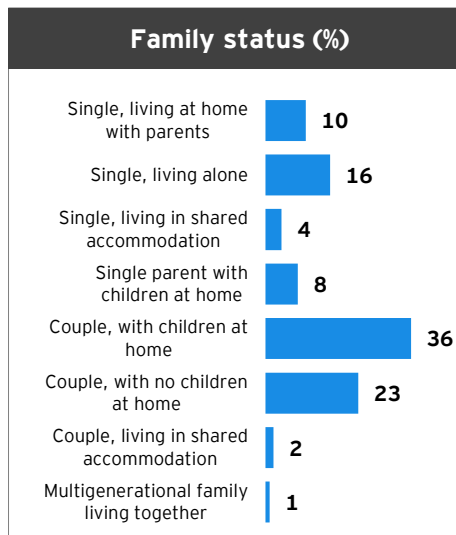
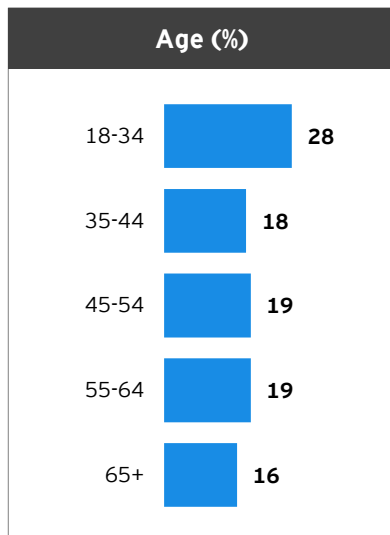
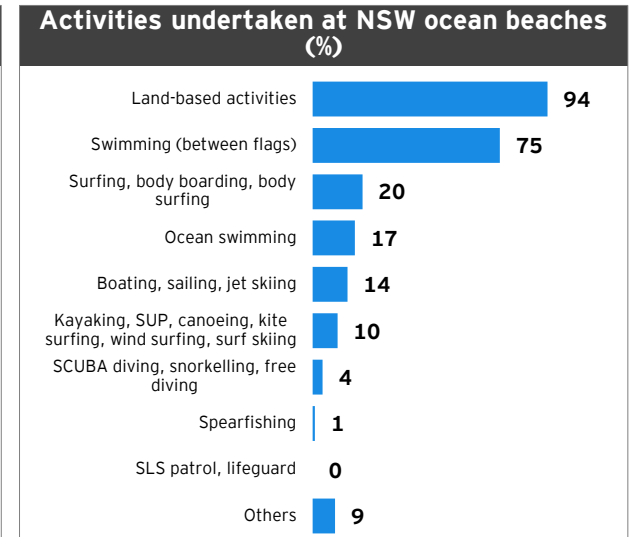
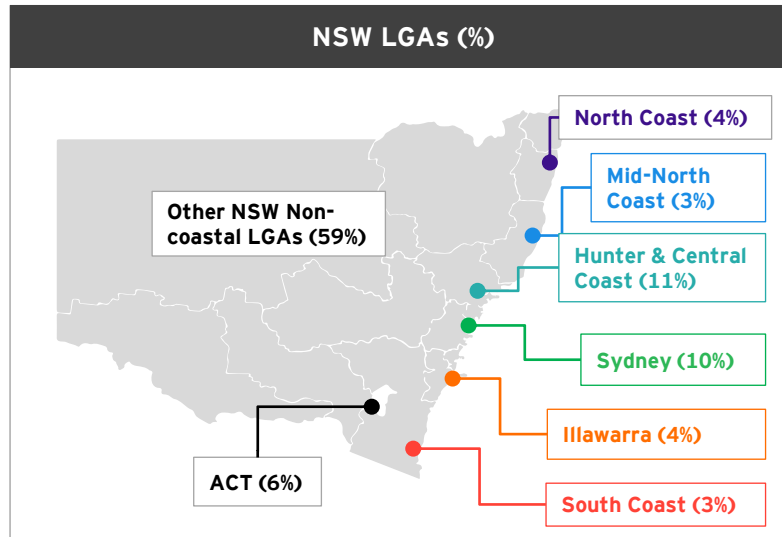
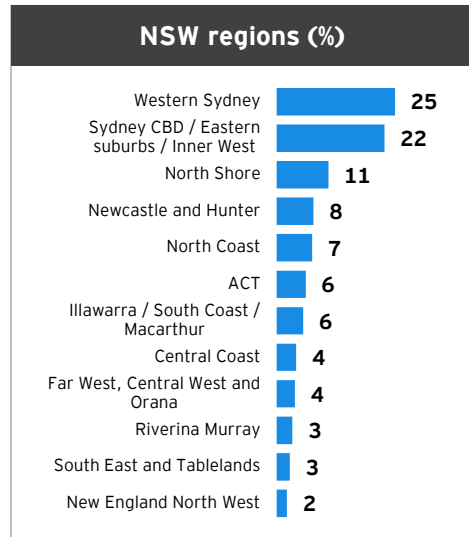
Base: Respondents who provided feedback to D5. NSW/ACT residents, n=345; Beachgoers, n=290; Opt-in Individual, n=316; Councils, n=15; Other organisations, n=36.
 *Note, the data is indicative as the sample size is small for this cohort
 D5. Do you have any final comments or suggestions you'd like to add regarding shark mitigation measures used at NSW ocean beaches?

Appendix



Sample profile

Sample profile - NSW/ACT residents (representative sample)

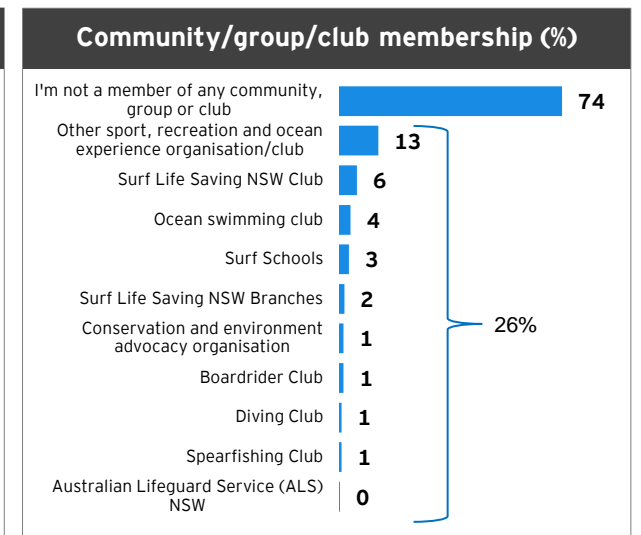
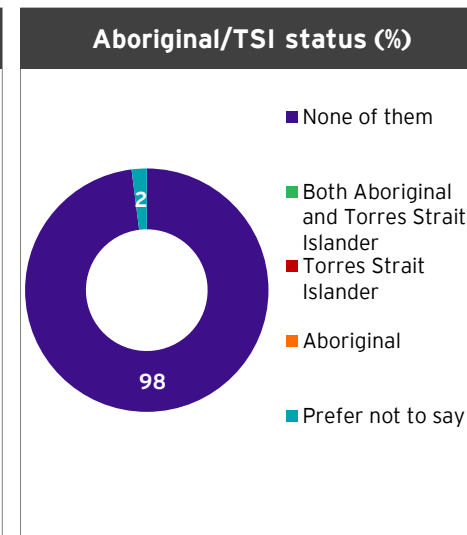
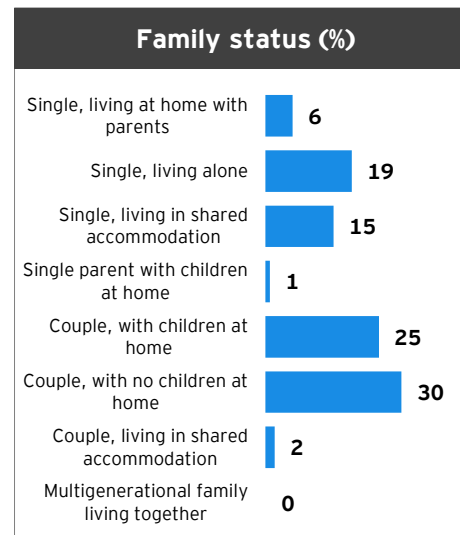
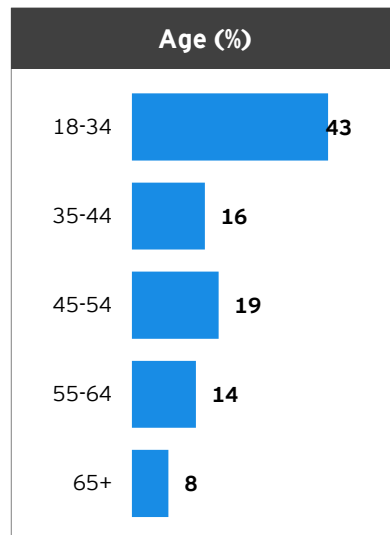
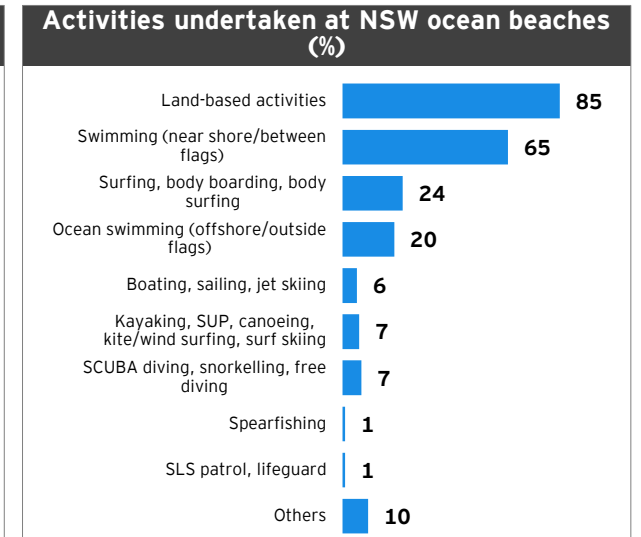
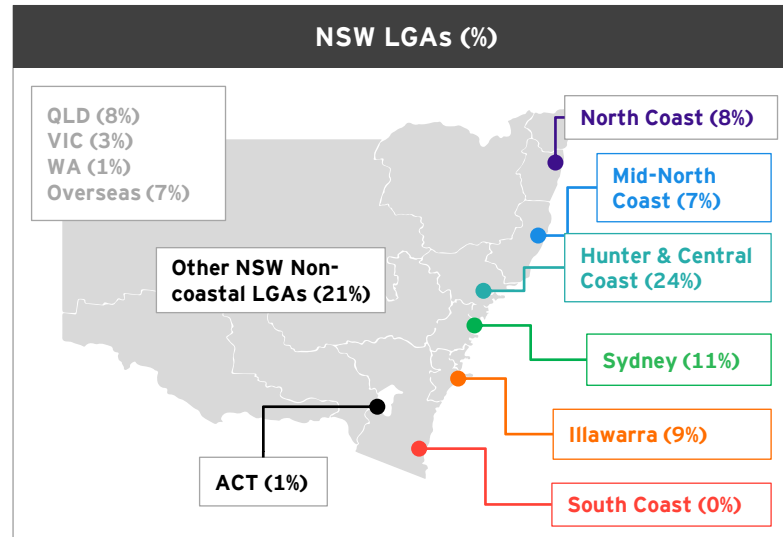
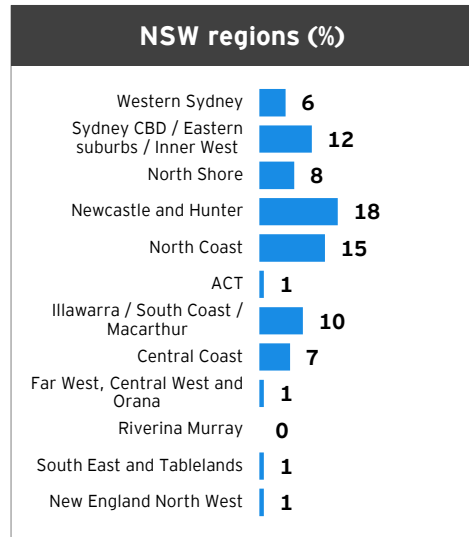


Base: All NSW/ACT residents, n=500

Note: The percentages on some charts might not add to 100% due to rounding or because 'Other' responses have not been shown in the charts HQ4. NSW region. HQ6. NSW LGA S13. Distance from closest coast. Q2. Main activities undertaken at NSW ocean beaches S16. Gender. S14. Age. D2. Family status. D4. Identification as Aboriginal/Torres Straits Islander D1. Community/group/club membership

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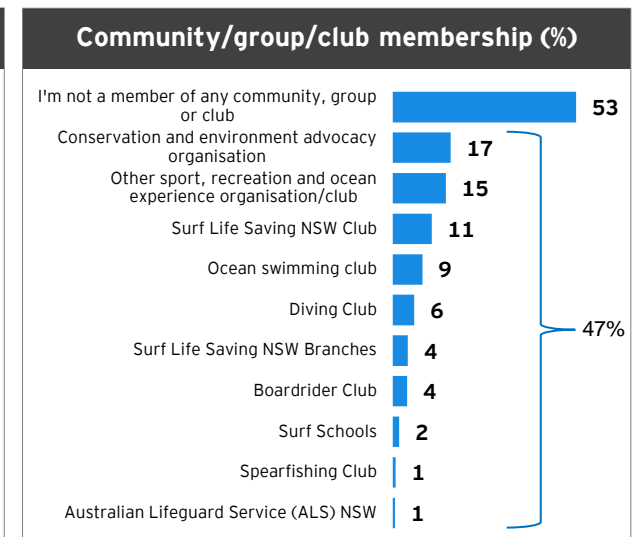
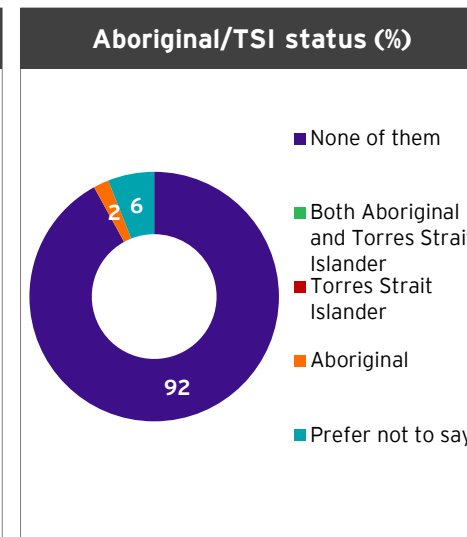
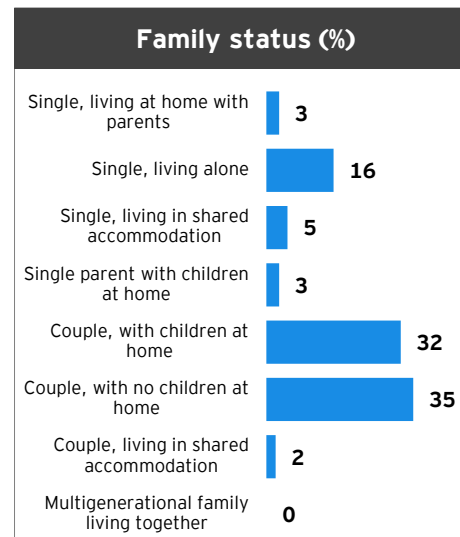
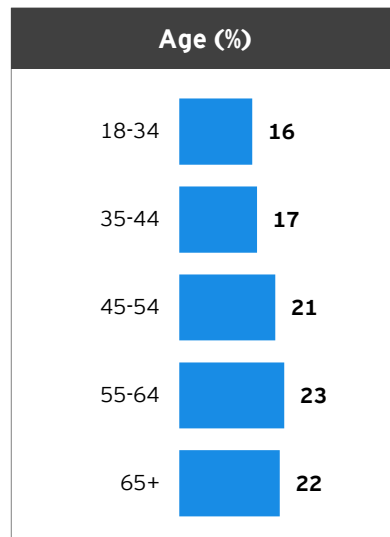
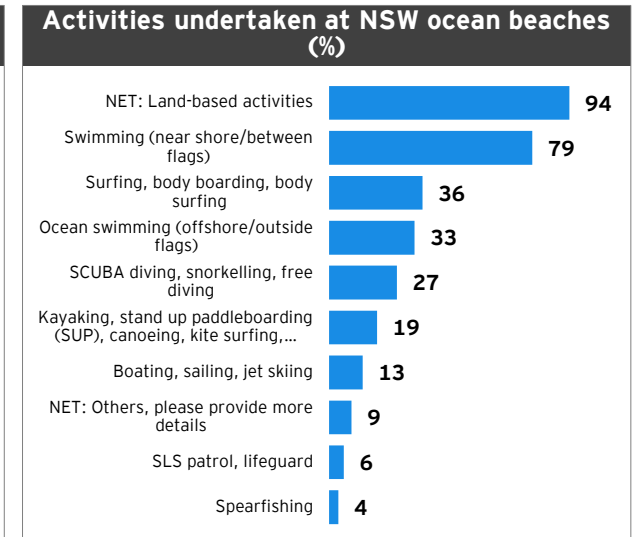
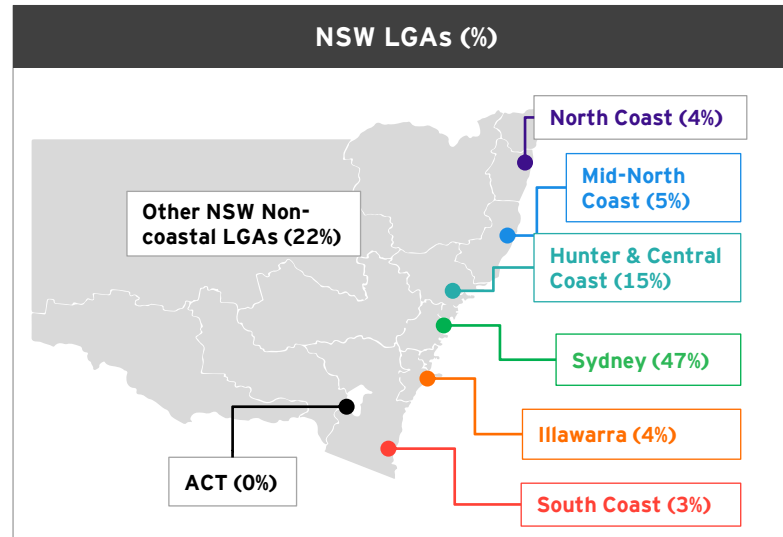
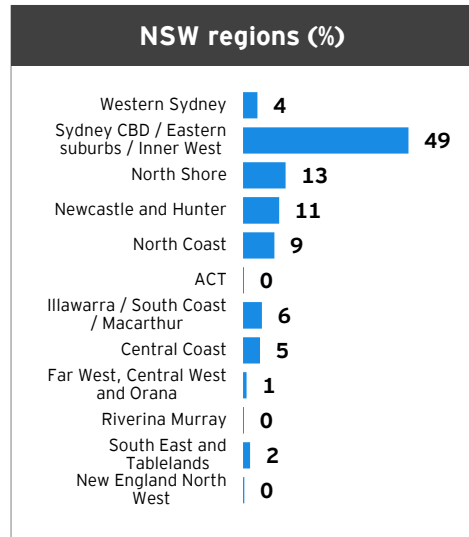
Sample profile - Beachgoers



Base: Beachgoers, n=336

Note: The percentages on some charts might not add to 100% due to rounding or because 'Other' responses have not been shown in the charts HQ4. NSW region. HQ6. NSW LGA S13. Distance from closest coast. Q2. Main activities undertaken at NSW ocean beaches S16. Gender. S14. Age. D2. Family status. D4. Identification as Aboriginal/Torres Straits Islander D1. Community/group/club membership

Sample profile - Opt-in individuals

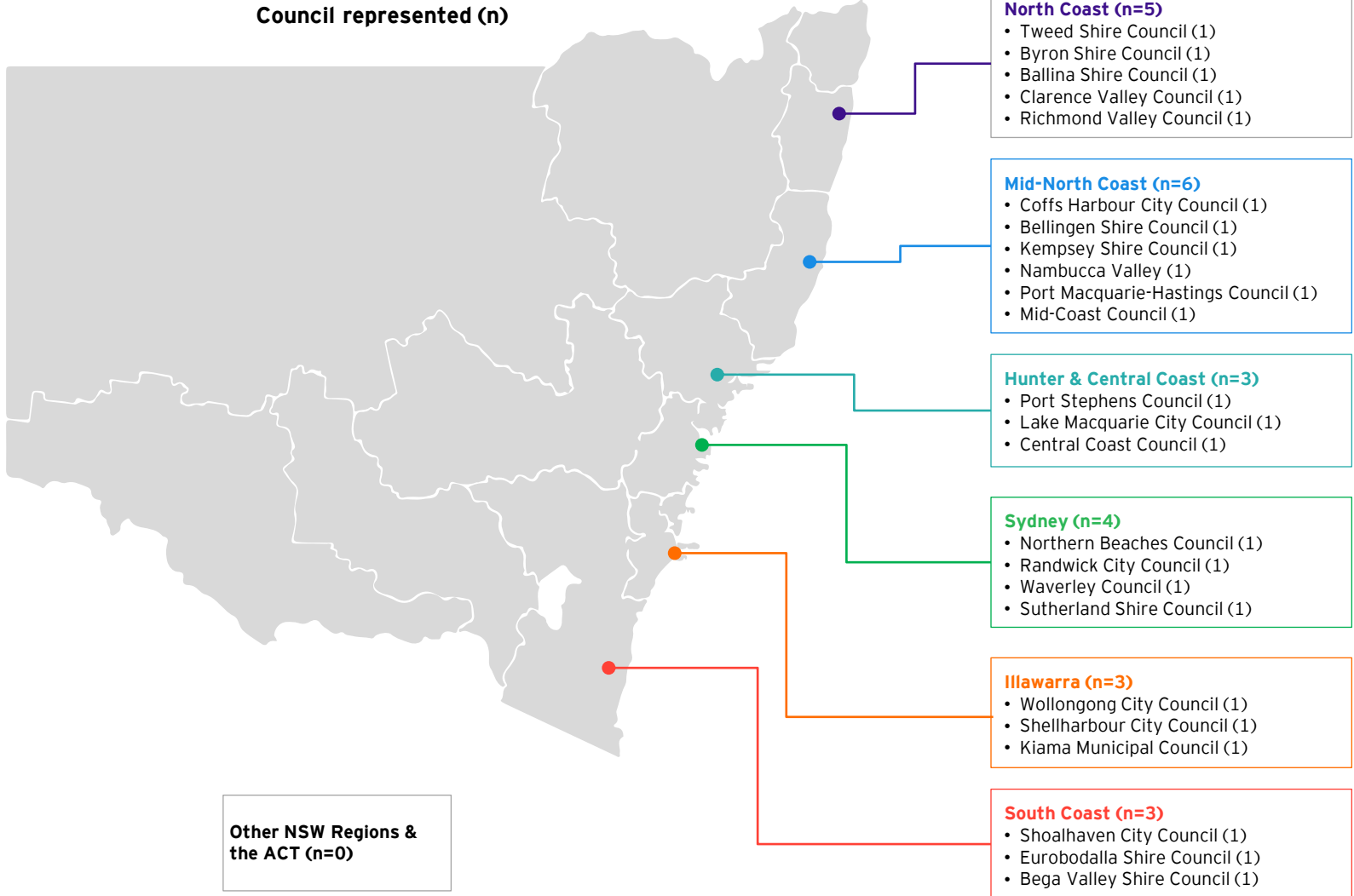
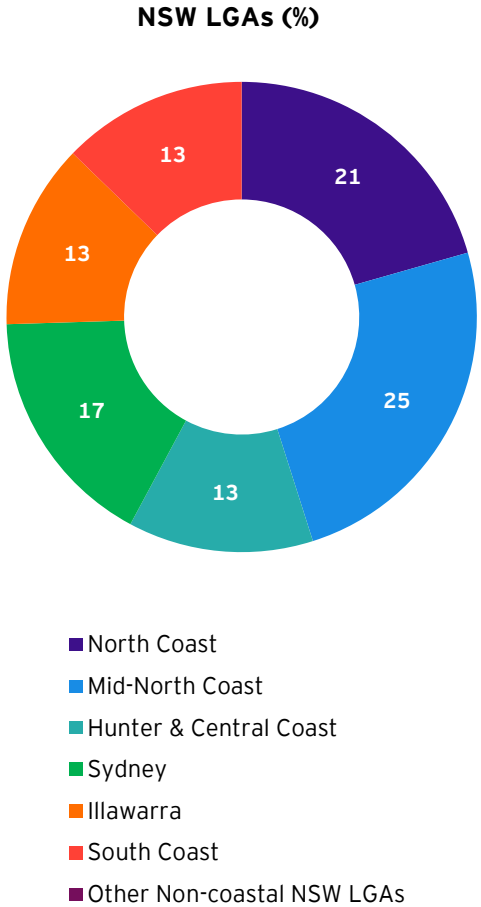


Base: Opt-in individuals n=2,651

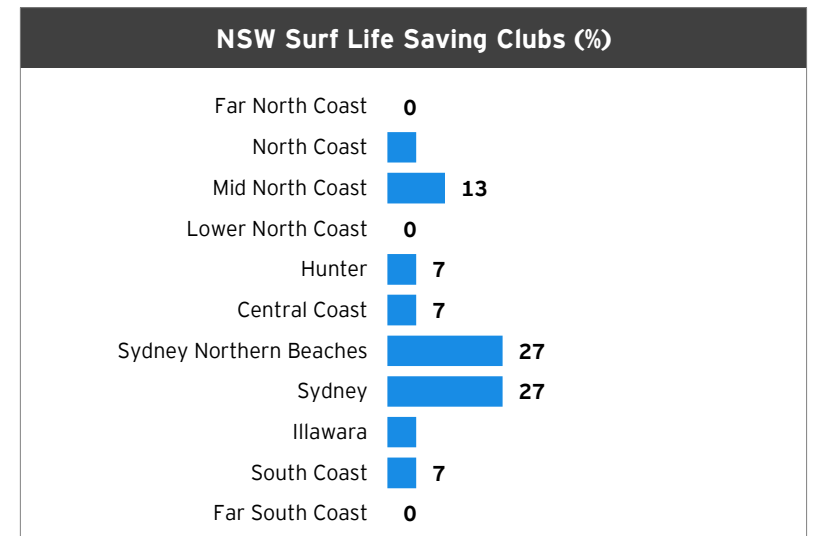
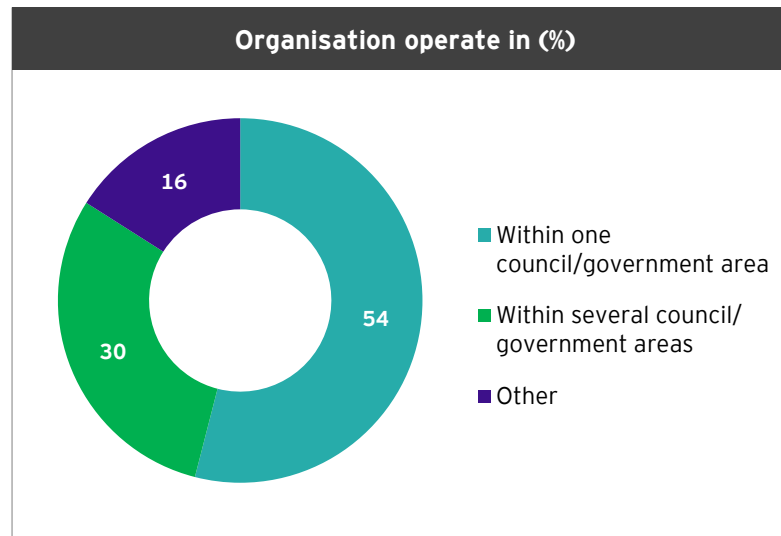
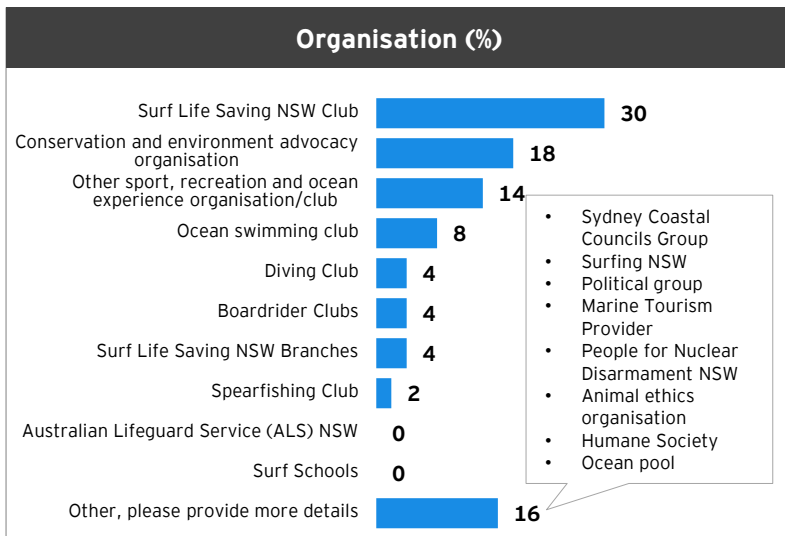
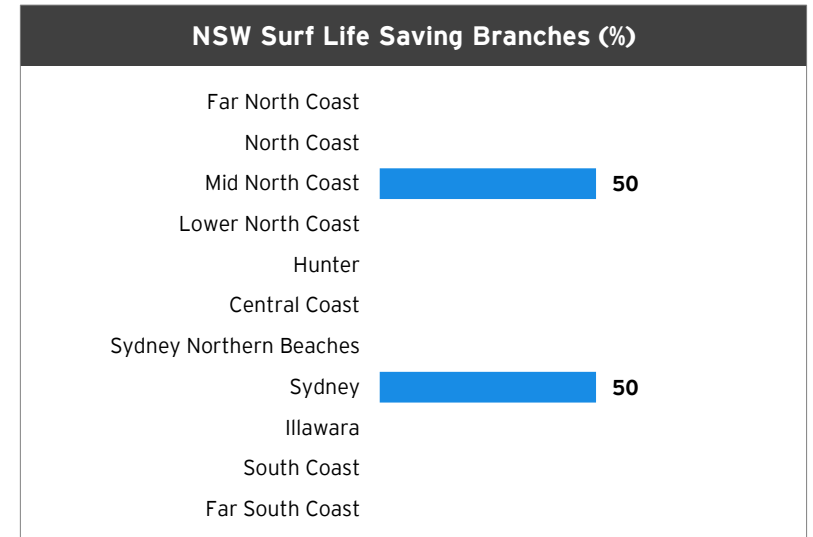
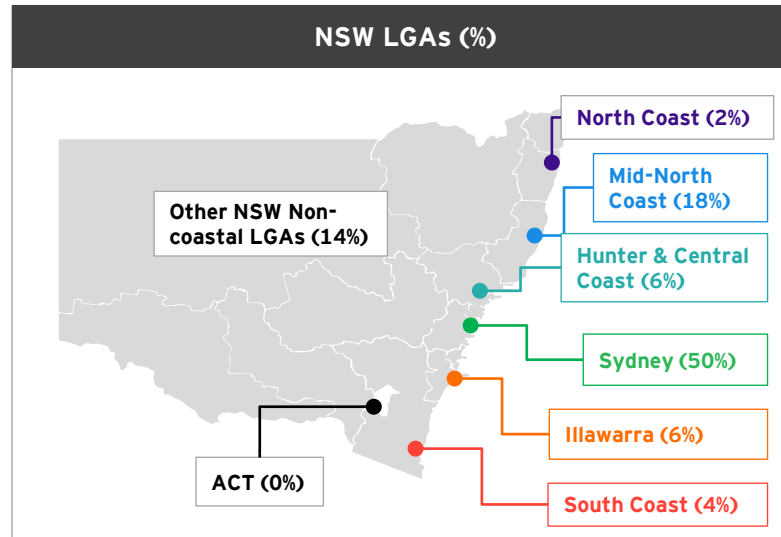
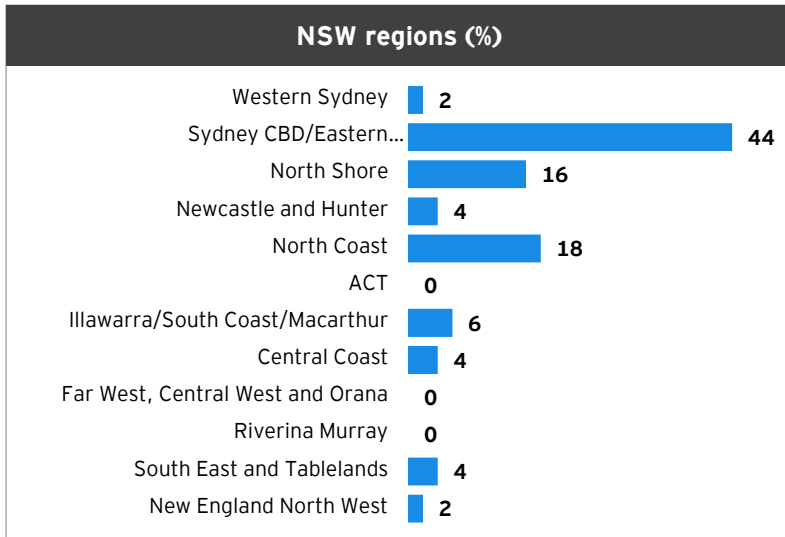
Note: The percentages on some charts might not add to 100% due to rounding or because 'Other'/'Prefer not to say' responses have not been shown in the charts. HQ4. NSW region. HQ6. NSW LGA S13. Distance from closest coast. Q2. Main activities undertaken at NSW ocean beaches S16. Gender. S14. Age. D2. Family status. D4. Identification as Aboriginal/Torres Straits Islander D1. Community/group/club membership

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Sample profile - Councils



Sample profile - Other Organisations



Base: Other Organisations n=50

Note: The percentages on some charts might not add to 100% due to rounding or because 'Other' responses have not been shown in the charts
 HQ4. NSW Region HQ6. 7 NSW LGW region S18. NSW Surf Life Saving Branches S6. Organisation type. S19. Organisation operate in S7. NSW Surf Life Saving Clubs

Beach visitation

Frequency of visitation in summer months - By regions

NSW ocean beach visitation in the summer months - By regions (%)

| | All | North Coast | | | Mid-North Coast | | | Hunter & Central Coast | | | Sydney | | | Illawarra | | | South Coast | | | Other Non-coastal NSW LGAs | | |
|--|-------|-------------------|-----------|--------------------|-------------------|-----------|--------------------|------------------------|-----------|--------------------|-------------------|-----------|--------------------|-------------------|-----------|--------------------|-------------------|-----------|--------------------|----------------------------|-----------|--------------------|
| | | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals |
| n= | 3,353 | 22* | 26* | 102 | 18* | 24* | 131 | 62 | 81 | 392 | 31 | 35 | 1,236 | 16* | 29* | 92 | 17* | 1* | 79 | 275 | 74 | 548 |
| Every day | 21 | 9 | 54 | 31 | 6 | 33 | 41 | 7 | 15 | 18 | 14 | 11 | 30 | 0 | 21 | 28 | 24 | 0 | 38 | 2 | 7 | 4 |
| Several times a week but not every day | 36 | 23 | 35 | 41 | 55 | 42 | 35 | 17 | 21 | 40 | 22 | 54 | 49 | 32 | 69 | 45 | 28 | 0 | 35 | 13 | 11 | 24 |
| Once a week | 14 | 23 | 8 | 12 | 17 | 17 | 9 | 18 | 28 | 15 | 20 | 14 | 11 | 24 | 7 | 11 | 24 | 100 | 15 | 12 | 20 | 18 |
| Once every 2-3 weeks | 12 | 30 | 4 | 8 | 0 | 4 | 8 | 29 | 20 | 14 | 20 | 14 | 6 | 24 | 3 | 8 | 24 | 0 | 6 | 23 | 26 | 21 |
| Once a month | 6 | 5 | 0 | 4 | 6 | 0 | 2 | 9 | 6 | 5 | 14 | 3 | 2 | 14 | 0 | 3 | 0 | 0 | 1 | 15 | 15 | 12 |
| Once every 2 to 3 months | 5 | 5 | 0 | 1 | 11 | 4 | 2 | 9 | 4 | 5 | 4 | 3 | 1 | 6 | 0 | 2 | 0 | 0 | 0 | 12 | 11 | 9 |
| Once every 4 to 6 months | 3 | 0 | 0 | 2 | 6 | 0 | 1 | 1 | 2 | 2 | 4 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 3 | 11 | 5 | 5 |
| Less often | 4 | 5 | 0 | 1 | 0 | 0 | 2 | 10 | 4 | 2 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 5 | 6 |

● Indicates significantly higher compared to all NSW/ACT
● Indicates significantly lower compared to all NSW/ACT

Frequency of visitation outside of summer months - By regions

NSW ocean beach visitation outside of the summer months - By regions (%)

| | All NSW/ACT | North Coast | | | Mid-North Coast | | | Hunter & Central Coast | | | Sydney | | | Illawarra | | | South Coast | | | Other Non-coastal NSW LGAs | | |
|--|-------------|-------------------|-----------|--------------------|-------------------|-----------|--------------------|------------------------|-----------|--------------------|-------------------|-----------|--------------------|-------------------|-----------|--------------------|-------------------|-----------|--------------------|----------------------------|-----------|--------------------|
| | | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals | NSW/ACT resident^ | Beachgoer | Opt-in individuals |
| | n= 3,309 | 22* | 26* | 102 | 18* | 24* | 131 | 61 | 81 | 392 | 31 | 34 | 1,233 | 17* | 29* | 92 | 17* | 1* | 79 | 265 | 66 | 545 |
| Every day | 12 | 9 | 31 | 21 | 0 | 13 | 29 | 1 | 11 | 13 | 5 | 6 | 17 | 0 | 7 | 14 | 0 | 0 | 22 | 2 | 6 | 1 |
| Several times a week but not every day | 29 | 14 | 38 | 40 | 39 | 42 | 37 | 9 | 19 | 28 | 16 | 53 | 42 | 13 | 34 | 41 | 14 | 0 | 42 | 3 | 8 | 13 |
| Once a week | 15 | 19 | 23 | 17 | 28 | 21 | 15 | 8 | 26 | 17 | 14 | 18 | 17 | 11 | 14 | 17 | 35 | 0 | 13 | 4 | 11 | 13 |
| Once every 2-3 weeks | 13 | 14 | 0 | 10 | 0 | 8 | 8 | 19 | 15 | 15 | 14 | 3 | 11 | 23 | 28 | 13 | 17 | 100 | 8 | 14 | 20 | 16 |
| Once a month | 10 | 19 | 4 | 3 | 11 | 0 | 7 | 20 | 14 | 10 | 14 | 6 | 7 | 28 | 14 | 8 | 14 | 0 | 10 | 15 | 20 | 15 |
| Once every 2 to 3 months | 9 | 21 | 0 | 4 | 11 | 13 | 2 | 20 | 4 | 9 | 16 | 6 | 3 | 6 | 0 | 3 | 17 | 0 | 3 | 27 | 14 | 19 |
| Once every 4 to 6 months | 5 | 0 | 0 | 2 | 11 | 0 | 2 | 6 | 1 | 3 | 7 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 3 | 10 | 12 | 11 |
| Less often | 8 | 5 | 4 | 4 | 0 | 4 | 1 | 16 | 11 | 5 | 14 | 9 | 3 | 19 | 3 | 1 | 4 | 0 | 1 | 26 | 11 | 12 |

● Indicates significantly higher compared to all NSW/ACT
 ● Indicates significantly lower compared to all NSW/ACT

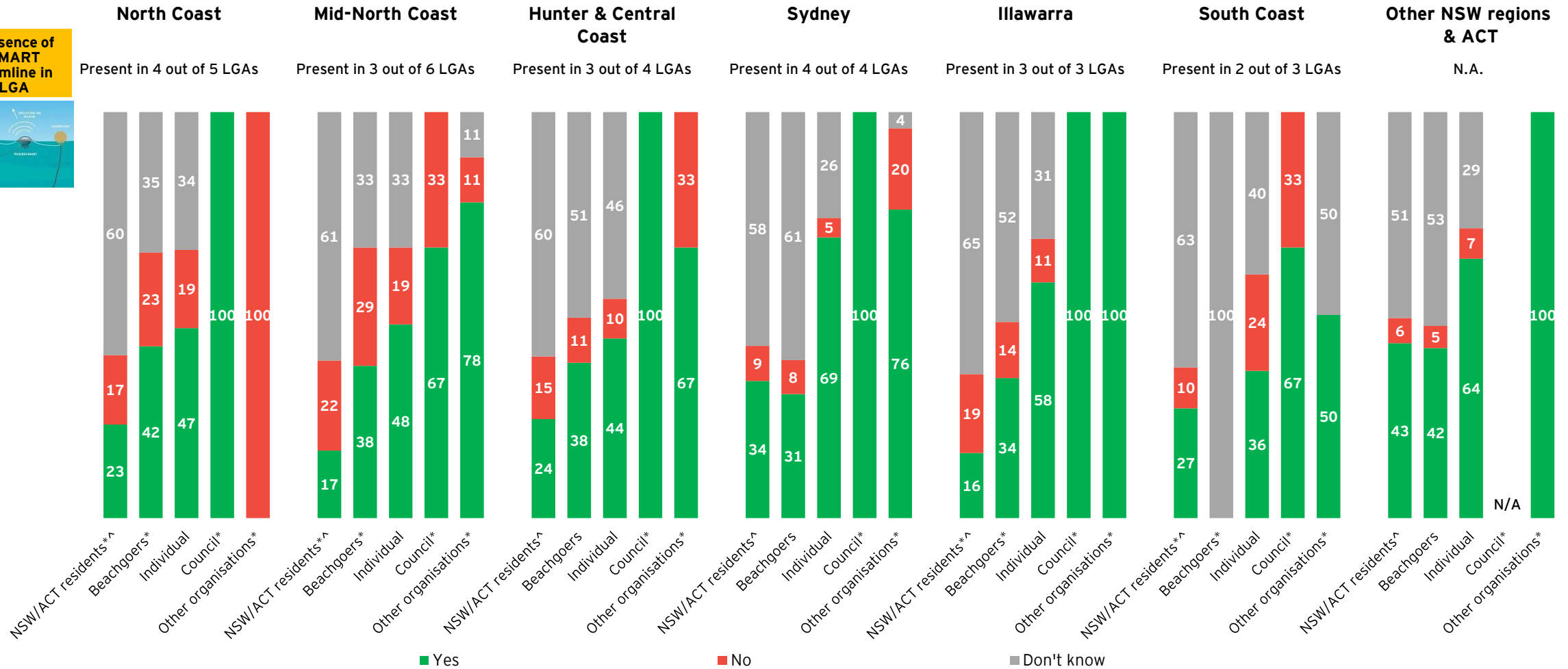
Base: NSW/ACT residents who have visited NSW beaches in the last 12 months n=431, Beachgoers n=304, Opt-in individuals n=2,574
 Note: *Indicates small sample size, indicative only, ^Indicates representative sample
 Q1. Typically, how often have you visited NSW ocean beaches during the summer months and outside of summer months?



Awareness of shark
mitigation technology
used in local Council
area / NSW

Awareness and presence of SMART drumlines by cohorts within LGA

Awareness and presence of SMART drumlines by cohorts within LGA (%)



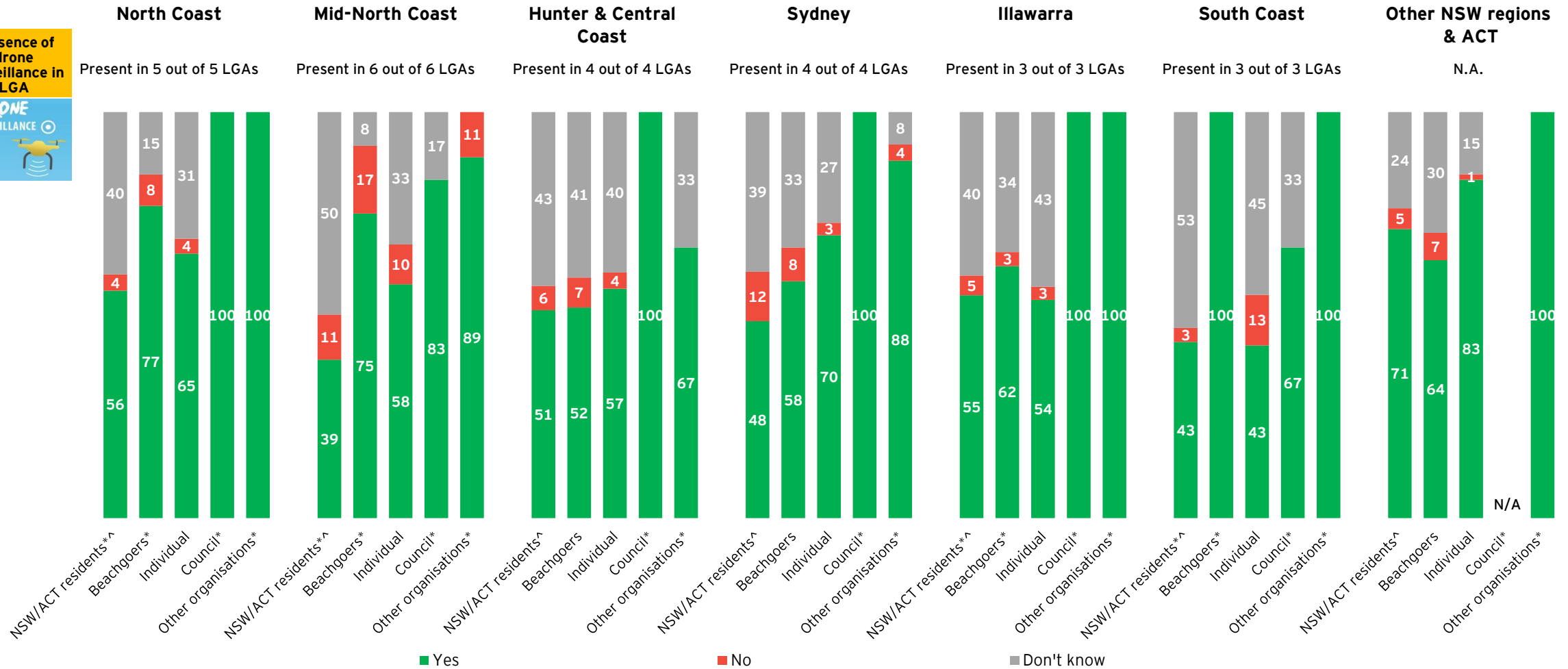
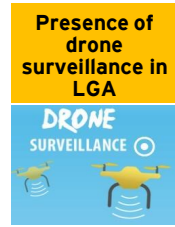
Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50

Note: * Denotes small sample size (n<30), ^Indicates representative sample

Q9. Which of the following shark mitigation measures are currently used in your Council area / NSW to increase protection of beachgoers?

Awareness and presence of drone surveillance by cohorts within LGA

Awareness and presence of drone surveillance by cohorts within LGA (%)

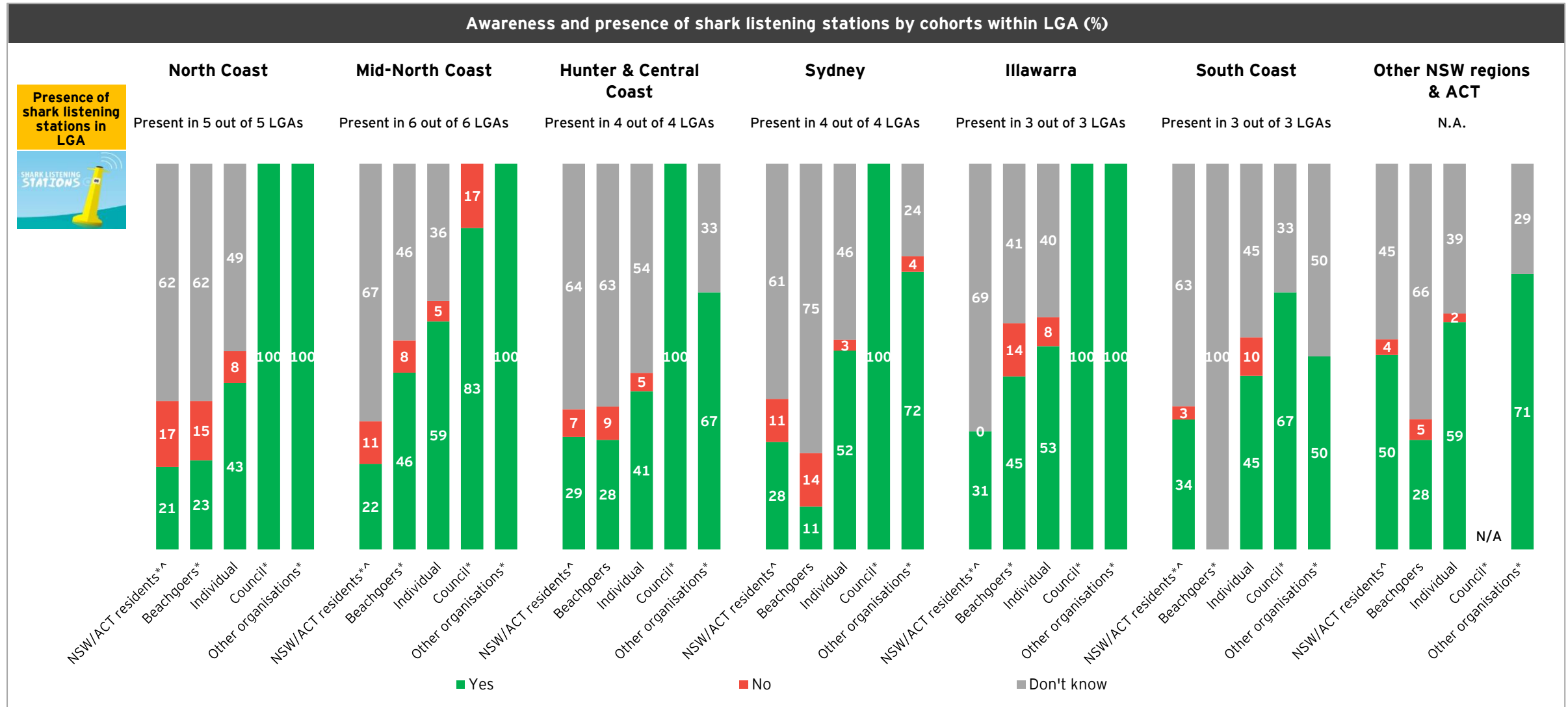


Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50

Note: * Denotes small sample size (n<30), ^Indicates representative sample

Q9. Which of the following shark mitigation measures are currently used in your Council area / NSW to increase protection of beachgoers?

Awareness and presence of shark listening stations by cohorts within LGA

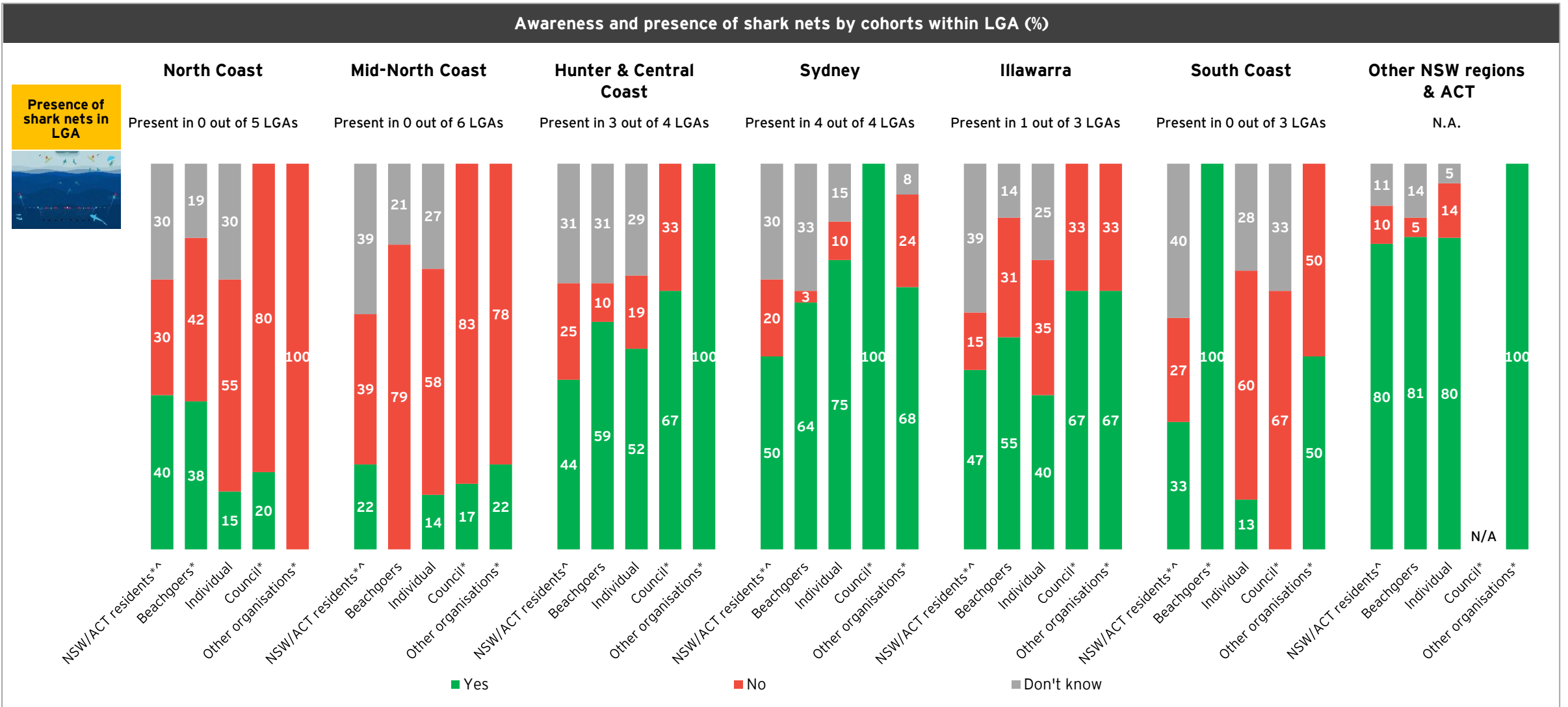


Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50

Note: * Denotes small sample size (n<30), ^Indicates representative sample

Q9. Which of the following shark mitigation measures are currently used in your council area / NSW to increase protection of beachgoers?

Awareness and presence of shark nets by cohorts within LGA



Base: All NSW/ACT residents, n=500; Beachgoers, n=336; Opt-in Individual, n= 2,651; Councils, n=24; Other organisations, n=50

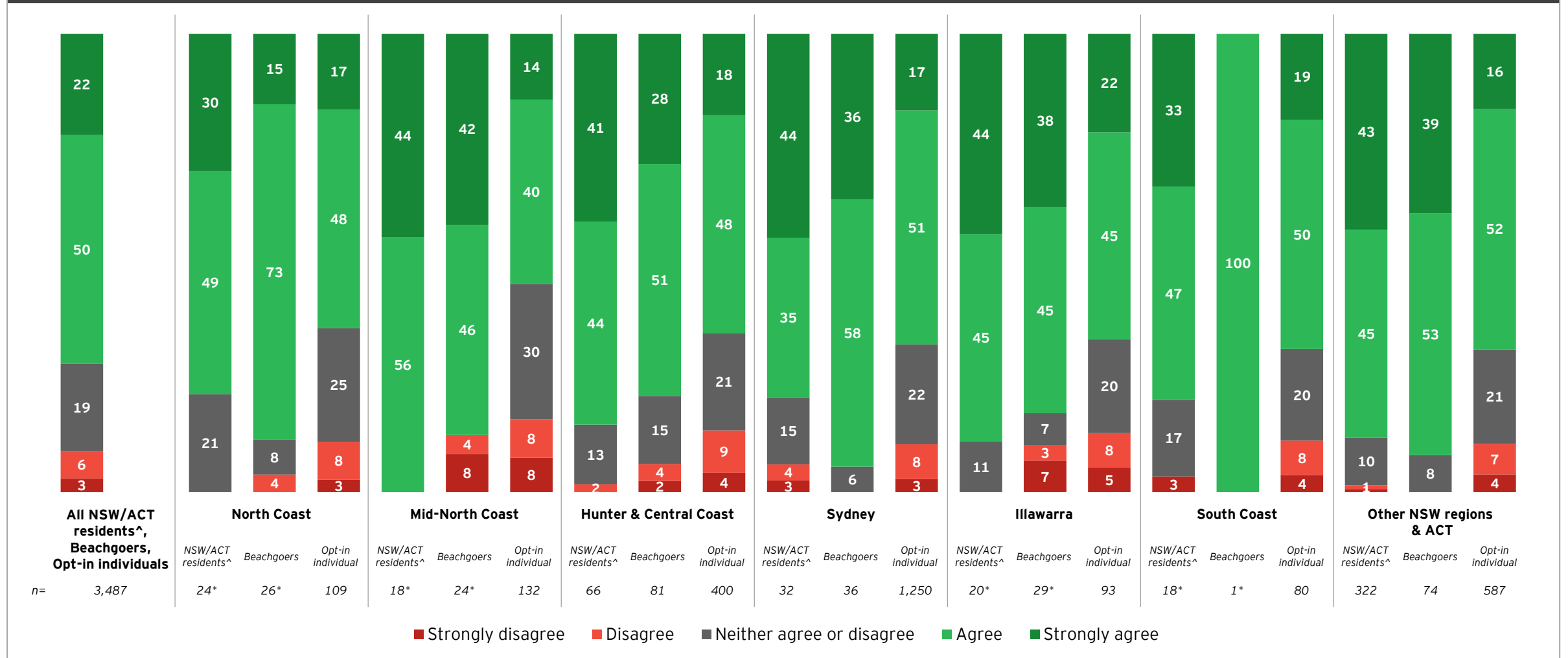
Note: * Denotes small sample size (n<30), ^Indicates representative sample

Q9. Which of the following shark mitigation measures are currently used in your council area / NSW to increase protection of beachgoers?

Survey perception

Impact of completing survey - By regions

Agreement with : Completing this survey has increased my knowledge and understanding of the shark mitigation technologies - By regions (%)

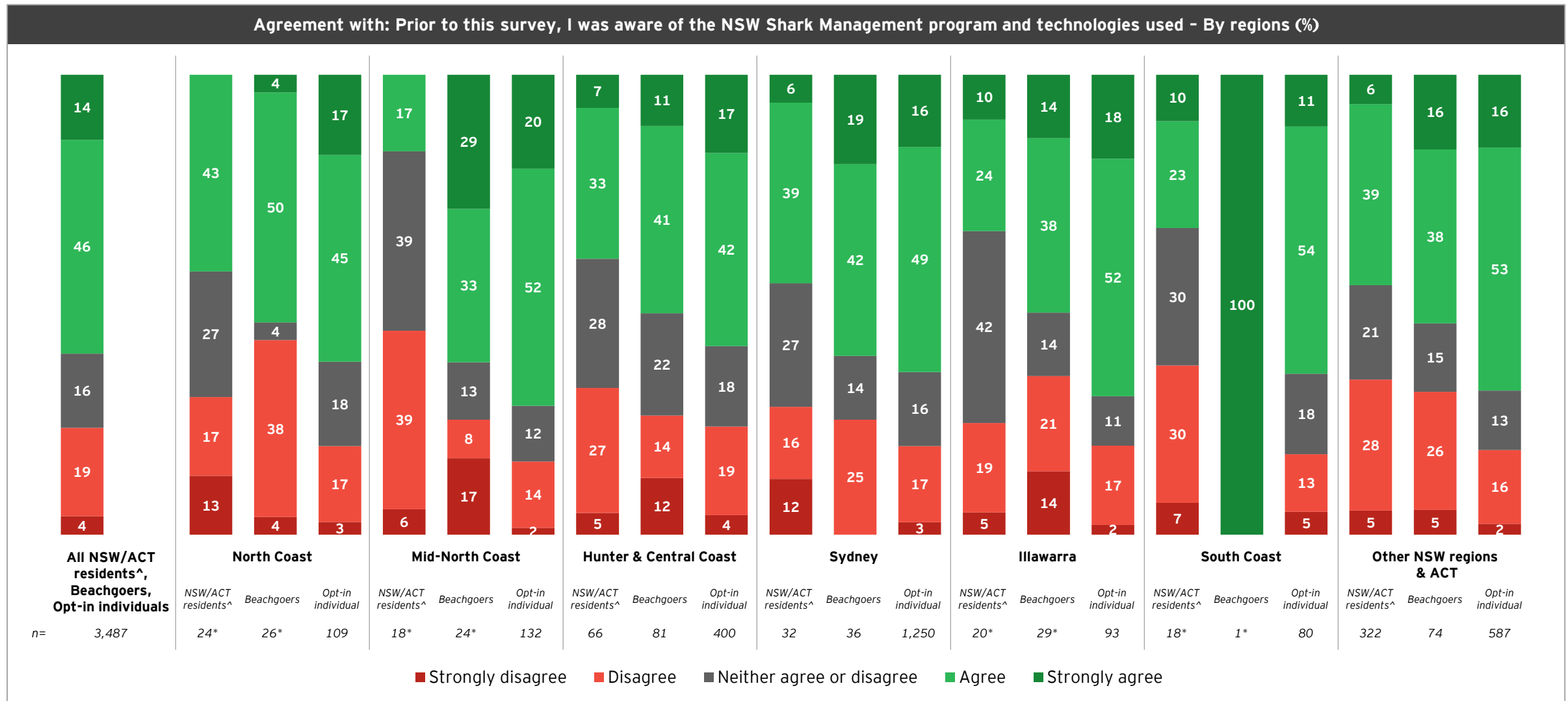


Base: NSW/ACT residents, n=500, Beachgoers, n=336, Opt-in individuals n=2,651

Note: * Denotes small sample size (n<30), ^Indicates representative sample

Q16_1. To what extent you agree or disagree with the following statement: Completing this survey has increased my knowledge and understanding of the shark mitigation technologies used at NSW ocean beaches to increase protection of beachgoers

Impact of completing survey - By regions



Base: NSW/ACT residents, n=500, Beachgoers, n=336, Opt-in individuals n=2,651

Note: * Denotes small sample size (n<30), ^Indicates representative sample Q16_3. To what extent you agree or disagree with the following statement: Prior to this survey, I was aware of the NSW Shark Management Program and technologies used to increase protection of beachgoers at ocean beaches

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ED None.

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