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Calculating your shelter's magic number: the key to saving lives *and* providing great care

What is the perfect number of animals to have in your shelter at any one time? Too few animals may give the impression that animals are not being helped in the community and willing adopters may walk out of the shelter empty-handed because they could not find a pet. Too many animals lead to needlessly increased costs and length of stay (LOS), compromised conditions for care, and in the worst case scenario, adopters who are so overwhelmed by choices that they do not take any animal home at all.

Just the right number, and welfare and health are maximized while cost is minimized, more animals are served over time, and everybody wins! We know which of these three options we want, but how to decide that elusive "just right" number? To help each shelter answer this question, we have developed this article and the associated "Magic Number Calculator". We hope these tools are useful for you!

Capacity for Care (C4C)

Capacity for care (C4C), considered holistically, means meeting the needs of every cat admitted to a shelter, whether feral or friendly, stray or owner surrendered, young or old.

[The Five Freedoms of Animal Welfare](#) provide a framework to define what it means to meet the needs of any animal in confinement. Assuring C4C also supports success in meeting a Sixth Freedom, the freedom from euthanasia for animals that are neither terminally ill nor dangerous.

It can be helpful to think of capacity for care (C4C) in terms of income and expenses. Admitting an animal is the equivalent of spending, and finding the right outcome is our parallel to earning income. The space in the middle, filling the shelter, is like spending on credit. It allows a delay between admission and outcome, just as a credit card can fill the gap between spending and earning.

The right amount of space to fill is like the right credit limit: it allows time between admission and outcome to provide needed care, get the animal ready for adoption, and plenty of time for the animal to be on display for the right home to come along. Too much space to fill is like a credit limit far greater than what can be paid off each month. Instead of moving actively through the system with care provided each step of the way, animals spend time "waiting in line" for space to open on the next step of the pathway through the system – whether that's a spot on the surgery schedule, a place on the adoption floor, or the chance to be adopted.

Just as it's fine not to spend everything earned each month, it can be okay to sometimes have extra income (do not always fill the shelter). Likewise admitting beyond our ideal capacity will put us into debt (crowding, undesired outcomes, etc.) as surely as spending beyond income.

Most shelters were built with an amount and type of housing - the credit limit equivalent - disconnected from the amount necessary to move animals as humanely, successfully and quickly as possible to the right outcomes. Right sizing



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the shelter by determining the shelter's C4C and implementing proactive population management and thoughtful strategies to maintain that number allows every shelter to function at its highest potential – and makes for happier staff and volunteers as well. It is important to look at “income and expenses” on a monthly rather than annual basis because these factors change so much throughout a year's time, especially for cats.

The role of Length of Stay (LOS)

Once a shelter's magic number is determined and thus their C4C, the shelter will simply work within a new, healthy steady state. What is really fascinating and so simple is that going from 50 to 25 cats in the shelter automatically cuts all cats' average LOS in half with all other factors remaining equal. Thus optimizing LOS is an extremely important focus to maintaining a shelter's magic number and C4C, and maintaining the magic number in turn optimizes LOS.

The number of animals waiting for anything to happen is integrally tied to LOS. In general, the more animals who are waiting, the longer the average LOS will be. Simply having more animals waiting does not speed up the time that things happen; in fact the opposite is often true.

Finding a shelter's magic number is made both more critical and more complicated by the fact that LOS is not neutral for all shelter animals. Some animals will benefit from the opportunity to stay longer in the shelter, particularly those that will receive active treatment or rehabilitation while awaiting adoption, or those that have a unique characteristic (e.g. bonded pairs, animals with conditions requiring special care) that makes them suited for a limited number of adopters that come along relatively rarely.

However, for most animals that enter the shelter healthy and friendly, increased LOS tends to be detrimental rather than beneficial. The more challenging the conditions in the shelter and the less optimal the housing, the more this will be true. Multiple studies have documented time in the shelter as the single greatest risk factor for illness in shelter animals[1-3]. In turn, illness contributes to yet longer stays – a detour within the shelter system with substantial cost and yet more challenges for care. An animal that is depressed or develops stereotypic behavior from prolonged confinement sees their chances for adoption further decrease.

Good news about good care

The [Association of Shelter Veterinarian's Guidelines for Standards of Care in Animal Shelters](#) emphasize the importance of the physical environment:

“Primary enclosures must provide sufficient space to allow each animal, regardless of species, to make normal postural adjustments, e.g., to turn freely and to easily stand, sit, stretch, move their head, without touching the top of the enclosure, lie in a comfortable position with limbs extended, move about and assume a comfortable posture for feeding, drinking, urinating and defecating”[4].

The figures below illustrate the relationship between housing quality, stress, and live release for shelter cats.



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Figure 1: Stress score decreased dramatically faster in cats housed upon intake in larger, double compartment cages compared to cats in traditional single compartment ~ 2' by 2' units. This correlated with a decreased risk of euthanasia as well as allowing the cats to progress to rescue or adoption more quickly.

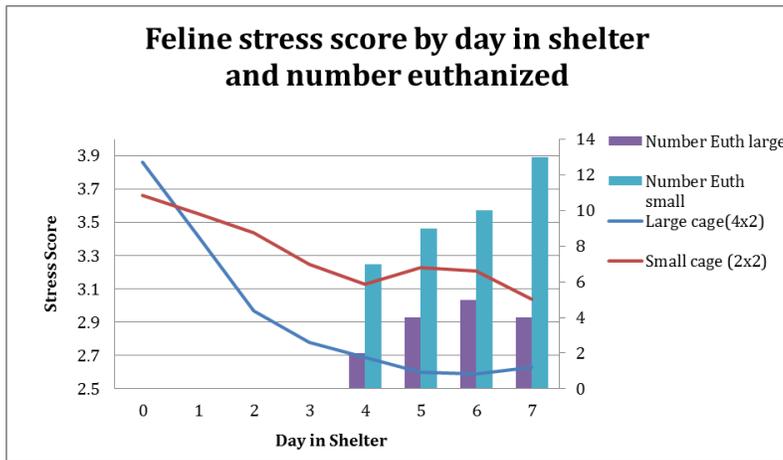
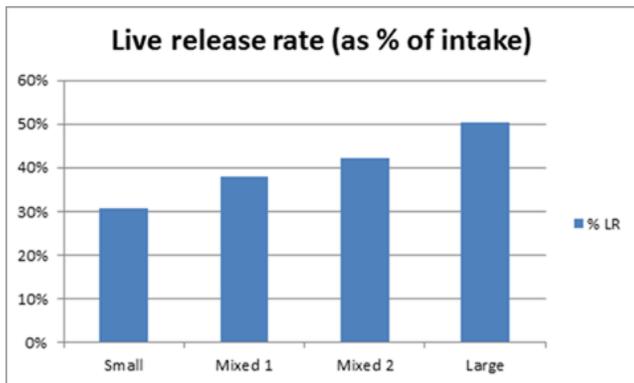


Figure 2: Live release rate at the same shelter during four equivalent time periods when cats were housed in all small cages (time period 1), a mix of large and small cages (time periods 2 and 3), or all large, double compartment cages (time period 4, cages were ~ 4' wide by 28" deep). No additional space was added as cages were converted, so the number of cages decreased as the size of the cages increased (primarily by portalizing existing cages).



Given the importance of good quality, humane housing, it makes sense to embark on a long term plan to ensure these conditions for every animal from the time of intake. When planning a new facility, making an investment in a sufficient number of high quality housing units will be a foundation for success over decades to come. For existing facilities, retrofitting cages and kennels can be an extensive undertaking, but very worthwhile as needed to ensure humane care. Either way, few shelters are burdened with extra money or space – “right sizing” the population allows investment in the number of high quality housing units that will serve the population optimally and no more than this number.



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Getting to your magic number

If you are starting out with a brand new empty shelter, getting to your magic number will not be a problem: simply open your doors, and within a few days no doubt your shelter will be full of happy animals awaiting their forever homes. But what if you already have a group of animals in the shelter, more than your magic number?

Any number of animals will tend to be self-sustaining: if a shelter has 10 animals for adoption and adopts out an average of 1 a day, the average LOS will be...you guessed it, 10 days! If one day they admit another 10 animals without adopting out an extra 10, the population awaiting adoption will be 20. If adoptions continue at 1 a day, the average LOS will now be 20 days, and will remain at 20 days unless the population awaiting adoption is reduced or adoptions are increased. So what to do to get back from 20 to 10?

For cats, a population reduction can happen naturally during the winter months when fewer kittens are admitted. This can be a good time to shift the housing to support the ideal capacity, which as noted above will then tend to be self-sustaining. If a population shift does not occur naturally, however, some active steps will be required.

Inevitably, a population expands when intake exceeds live release, and eventually reaches some steady state where intake matches outcomes. When the shelter in the example above took in 10 more animals than were adopted one day, the next day they had an extra 10 in their care, and this will be sustained until active steps are taken. Similarly, if they wanted to reduce their population back to 10, then over some period of time they would need to release 10 more animals than were admitted.

This could be accomplished in one fell swoop through a big adoption promotion or a one-time transfer to a partner (if such is available), or through a more gradual effort to adopt or rescue just 1 or 2 animals more animals a day over a longer time period. Sometimes just by fast tracking the most adoptable while sustaining "background" adoptions for the slow trackers, the population will decline.

For shelters that manage intake, the magic number can also be reached by slowing down intake to allow adoptions and other positive outcomes to catch up. Whatever strategy is employed, remember this only needs to be done once: if the shelter in the example adopts out 2 animals a day instead of 1 for just 10 days, or defers intake of 1 animal a day for 5 days and adopts out 1 extra animal for 5 days, a new steady state will be reached. If this steady state allows provision of better housing and ideal care, and presents a good but not overwhelming mix of choices for the public, not only will it be sustained, adoptions are likely to increase, and cost of care and LOS will tend to decrease. The savings thus realized can be invested in other positive programs to help keep animals out of the shelter in the first place – a true win-win scenario!



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The Nitty Gritty: Calculating your shelter’s Magic Number

So after all this discussion, what is the elusive magic number of cats to have in your shelter? The perfect number is primarily driven by the average and maximum intake and number of adoptions and other positive outcomes achieved over time.

Using the Calculator

The calculator allows you to calculate the number of animals to have on each pathway at any one time to optimize your LOS and live release while minimizing risks and costs. It also allows calculation of your expected/target LOS based on types of intake and population characteristics (e.g. fast track vs. slow track). The calculator is designed to be used on a monthly basis.

What you will need to know in order to use the calculator is your data for a given month from the previous two years, specifically intake, on-site adoptions, and total outcomes. You will also want to document the current in-shelter population (both pre-adoption and up for adoption). Hopefully your shelter software has reports that easily break out this data for adult cats vs. kittens. Fill in the highlighted yellow cells with your shelter’s numbers and the calculator does the rest!

Inputting your data: intakes

Data from the two previous years will be input in the worksheet on the first tab (C4C recs) and only in the yellow cells (all other cells are locked, we hope!). Start with entering intakes from two years ago and last year (this will be all intakes regardless of type). An average for the two years will be calculated. If for some reason you expect intakes for this month this year to be higher (new contract, more transfers, etc.) or lower (providing alternatives to intake, discontinuing contract(s), etc.) than previous years, enter the expected number in the “expected this year cell”. However, if there are not any changes being made, use the average for the expected (just re-type it into the “expected this year” box).

Intake	Adults	Kittens	MDA adults	MDA kittens
2 years ago	75	46	2.5	1.5
Last year	89	40	2.9	1.3
Average	82	43	2.7	1.4
Expected this year	82	40	2.7	1.3

Notice that the calculator calculates the mean daily average (MDA) for your shelter. This is the average number of cats and kittens coming in each day.

Inputting your data: on-site adoptions

Since the calculator is meant to be used for the on-site C4C on a monthly basis, we want to determine how many cats should be on the adoption on-site pathway (vs. other pathways such as RTF, off-site adoptions, transfers, euthanasia,



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etc.). Enter on-site adoptions for cats and kittens for two years ago and last year. Again an average will be calculated, along with the MDA for adoptions. Again, if changes are expected this year that will either increase or decrease monthly adoptions, put the expected number of on-site adoptions in the expected cells. If there are not any changes being made, use the average for the expected.

On-site adoptions	Adults	Kittens	MDA adults	MDA kittens
2 years ago	50	30	1.6	1.0
Last year	58	25	1.9	0.8
Average	54	28	1.8	0.9
Expected this year	54	28	1.8	0.9

Inputting your data: total outcomes (including foster)

For the last two years, input the total number of outcomes for the month for all cats and kittens, including those going out to foster care (and include on-site adoptions here too). An average will be calculated. Usually the number of outcomes will be similar to the intake number, unless length of stay (LOS) tends to be very long. Again, if changes are expected this year that will either increase or decrease monthly outcomes (for example, lower intake which in turn would lower total outcomes), put the expected number of outcomes in the expected cells. If there are not any changes being made, use the average for the expected.

Total outcomes (including foster care)	Adults	Kittens
2 years ago	80	35
Last year	100	30
Average	90	33
Expected this year	90	30

Inputting parameters

We are going to get back to this – we promise! But first we need to think about realistic and thus helpful LOS's to enter since this can be the largest driver to a shelter's magic number. Read on...

Choosing your target LOS

In general, the *overall* target LOS to adoption should be 7-21 days total from intake to outcome for animals not requiring any rehabilitation or special care prior to becoming adoptable, with no more than ~ 3-10 days average post-hold waiting for adoption (very small shelters may be an exception, with housing planned accordingly to support a longer LOS). This includes time spent in stray holding or quarantine. Routine procedures such as spay/neuter and behavioral evaluation should be accommodated during the average holding (pre-adoption) time period or immediately thereafter whenever logistically possible.



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For many shelters, this will sound like an unrealistically short target LOS, but bear with us: aiming for an appropriate LOS for *all* animals will allow the shelter to better serve the potential for *each* animal to move through to the right outcome in the right time frame. This is NOT a time limit – the magic of weighted averages means that if “fast track” animals move through in an appropriately short time, “slow track” animals can have all the time they need. Best of all, no animal stays longer than necessary just because it is lost in the system.

Calculating pre-adoption/hold target LOS (LOS calculator tab of the worksheet)

This part needs to be done only once unless your intake and outcome percentages change substantially over time (unlike part one, which should be determined monthly or at least for peak and trough months of the year). Enter the number of cats in each category, modifying the categories as appropriate for your shelter (you do not need to enter data in every row if you do not take in that type of cat). For each category of intake, think about the necessary time to get everything needed done for cats in that category before they can move up to adoption or to another outcome (e.g. return to field). The spreadsheet will calculate the weighted average by multiplying the hold time by the % of cats in that category.

Pre-adoption/hold LOS adults				
Intake	#	%	Hold time	Weighted Average
Stray social/unknown	33	33%	6	2.0
Stray feral	33	33%	3	1.0
Surrender/return	33	33%	2	0.7
Transfer in		0%	2	0.0
Confiscate/legal hold		0%	21	0.0
Bite quarantine		0%	10	0.0
Other		0%		0.0
Total	99	100%		4

Pre-adoption/hold LOS kittens				
Intake	#	%	Hold time	Weighted Average
Stray weaned	25	25%	6	1.5
Surrendered weaned	25	25%	2	0.5
Transfer weaned		0%	0	0.0
Confiscate weaned		0%	21	0.0
Neonate	25	25%	0	0.0
Foster return	25	25%	1	0.3
Other		0%		0.0
Total	100	100%		2

Some things to think about when determining a realistic hold time for each type of intake at your shelter:



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- What is your legal stray hold?
- Can any animals be exempt from the stray hold such as feral cats, litters, under-aged, etc.?
- Can anything happen to the cats during the hold (evaluation, be seen by adopters, surgery, etc.)?
- Can cats and kittens go into foster during the stray hold?
- Does the shelter quarantine new intakes (transfers, owner surrenders, etc.)?
- Are there barriers to moving cats and kittens up to adoption/made available for adoption (surgery, housing space, etc.)? How much time do these barriers generally add?
- Can anything be done to help decrease the holding time for any/all of the intake categories?

Calculating available/adoption LOS

The ideal target LOS actually available for adoption (ready to go with all required holding periods and procedures completed) should ideally be 3-10 days. The lower end of the range can be used for shelters where animals can be viewed for adoption during a stray hold/quarantine period. For shelters where this is not the case the higher end of the range may be more appropriate.

If 3-10 days seems alarmingly short, remember the law of weighted averages – if most animals stay a shorter amount of time in adoptions (“fast track”), a few animals can stay quite a long time (slow track) and still hit a target LOS that is fairly short. You can use the fast/slow track average weighter for LOS to play around with different parameters that reflect your shelter’s intake and outcomes. For instance, many “fast track” animals (such as friendly young adults and kittens) can be adopted on the first weekend available. If intake occurs throughout the week, cats in the shelter for an average of 4 days span one weekend (those that come in Monday wait longer, those that come in Friday do not wait at all). Maybe we decide that “slow trackers” should have an average of 3 weeks to be viewed for adoption, or an average of 18 days (4 days plus two weeks). In the example below, estimating that 75% of intake at peak season will be fast trackers (kittens and foster returns, for instance), we use the average weighter to get an overall target LOS of...just 7.5 days!

Fast/slow track average weighter			
Fast/slow track	Percent	Average LOS	Weighted average
Fast track	75%	4	3.0
Slow track	25%	18	4.5
Overall			7.5

The fast/slow track average weighter can also be used to help determine realistic holding times for each intake category. As an example for owner surrenders (because all owner surrenders are not created equal), perhaps you might estimate that about 80% of owner surrendered cats are healthy and friendly and can go straight to surgery and/or adoption, but



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the remaining 20% need another ten days of medical care or observation. Giving 2 days in hold to get surgery scheduled, and 10 days in hold for more extensive care, for each category, results in an overall LOS in hold for this group of cats of 3.6 days. You would enter this number in the column D in the LOS calculator in the appropriate row.

Fast/slow track average weighter			
Fast/slow track	Percent	Average LOS	Weighted average
Fast track	80%	2	1.6
Slow track	20%	10	2.0
Overall			3.6

Also remember, if 3-10 days is much shorter than the current LOS at your shelter, that may reflect the fact that the number of animals in the shelter at one time may be higher than the recommended capacity. Simply reducing the number will automatically decrease the LOS while maintaining or improving live release. (Do not panic if there are more animals in your care right now than the calculator recommends – see the section on getting to your magic number for ideas on how to get there without having to increase euthanasia.) Meanwhile be optimistic when you choose your target LOS, keeping in mind these principles, and use the figures in the calculator to determine how many animals should be housed for each outcome pathway. And remember – you can always adjust as you go. You may well be pleasantly surprised!

Daily population predictor

The daily population predictor is based on fast track/slow track LOS and tells you what percentage of fast track versus slow track cats will actually be on the adoption floor based on the data entered in the Adoption LOS table. It often seems like most cats are slow track cats, but the true percentage is commonly over-estimated because of a relatively few cats that stay quite a long time. Most cats truly are fast track but since they live up to their name, they move quickly!

Parameters

Back to the first tab...now we can input the parameters that will be used in the calculations. For the parameters we use the LOS's that were calculated in the tables on the second tab (LOS calculator). You can find these numbers in the green cells in the weighted average column.

The #/housing unit numbers are the number of cats and kittens in each housing unit in both the pre-adoption/holding areas and on the adoption floor. For some shelters this is the same area and in others, the areas of the shelters are separate.



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For minutes of time for daily care, estimate how much time, in minutes, staff realistically needs to give the level of care (feeding and cleaning) that your shelter would like to provide to each cat and kitten. Since kittens tend to be messier than adults, the litter likely takes longer than an individual adult cat but each individual kitten gets less time when they are part of a litter thus the overall litter gets more time than an individual cat.

The on-site adoption rate is calculated for you from the above tables and thus nothing can be input here, it is simply meant as a reference.

Parameters	Adults	Kittens
LOS in pre-adoption/hold	4	2
LOS in adoption	8	3
#/housing unit pre-adoption	1	3
# /housing unit adoption	Assume 1	2
Minutes of time for daily care per cat	15	10
On-site adoption rate	60%	93%

Capacity recommendations based on expected parameters

This is where the magic happens! The only data that you need to input in this table is the number of cats and kittens currently in the shelter, both in pre-adoption/hold status and available for adoption. The rest of the cells in this table are locked formulas and provide the information that will be helpful to you for monthly population management planning.

All of the calculations are based on your actual data/expected numbers and target LOS which define your C4C (light and dark green cells). This is compared to your actual in shelter inventory of cats and kittens and calculates how many animals above or under your C4C your shelter currently is (rose colored cells). Likely as you are just getting started using this calculator, you will see that you are over your C4C. Do not panic. Take a deep breath, know that change is possible and refer to the section on getting to your magic number. Other great resources can be found at the end of this document.

The table also gives the number of humane housing units needed to house your C4C population and actual population. If this number is different from the actual humane housing units (double compartment or walk-in in unit to allow for the Five Freedoms of Animal Welfare) in your facility, something needs to change, be it decreased intake, shorter LOS or increased humane housing capacity.



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Capacity recommendations based on expected parameters						
Pre-adoption/hold	Adults	Kittens	Total cats	Adult housing	Kitten housing	Total housing
On-site adoption track holding	6	2	9	6	1	7
Other outcome holding	4	0	4	4	0	4
Total pre-adoption holding C4C	11	3	13	11	1	12
Actual pre-adoption inventory	30	20	50	30	7	37
Over or under?	19	17	37	19	6	25
Adoption on site C4C	14	3	17	14	1	16
Actual on site adoption inventory	20	10	30	20	5	25
Over or under?	6	7	13	6	4	9
Total moving towards outcome C4C	25	5	30	25	2	27
Total moving towards outcome inventory	50	30	80	50	12	62
Over or under?	25	25	50	25	9	34

Time needed for daily care

This table gives the estimated hours of daily care (cleaning and feeding) for the in-shelter cat/kitten population at C4C and at the current actual inventory. Again, if the actual or recommended “If at C4C” level is above the current staffing level, something needs to change. This tends to be a big reality check for shelters – do not be surprised, we all have a tendency to push ourselves to limits that actually are impossible to achieve when we care so much about the results. But fear not, improved housing and decreased LOS can work wonders to help bring the seemingly impossible into reach.

Time needed for daily care	Hours needed
If at C4C	7.1
Actual	17.5



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BONUS FUN FOR DATA GEEKS:

You do not need to use these tables, but they are available if you want to model various scenarios to help your staff and stakeholders understand the relationship between holding capacity, LOS and life-saving “throughput” capacity. These tables can also be helpful for facility planning.

Average weighter for LOS to adoption: fast track effect on slow track LOS (reverse calculator tab)

To help shelter staff understand the effects of fast track LOS on slow track animals, this table is very helpful. Simply input your average target LOS in adoption and the estimated % of animals that are fast track that are moving towards adoption. Lastly, enter the target average LOS for the fast track animals. From this information, the average LOS for the slow track animals will be calculated. This allows us to realize that we do not have to be concerned that we are setting time limits. However, do continue to remain aware of the population and not let the % of slow track animals creep up to the extent that it is creating barriers that slow down the fast trackers. Additionally, if this number exceeds two weeks, it raises a red flag to ensure that slow track housing meets a broad range of behavioral needs for the animals.

Average weighter for LOS to adoption: fast track effect on slow track LOS				
Overall target average LOS in adoption	Estimated % fast track	fast track target average LOS	% slow track	slow track average LOS
8	75%	3	25%	23

The adoption capacity reverse calculator

This calculator allows you to see how many adoptions can be achieved with a given number of housing units and a target LOS. Fill in the yellow highlighted cells with your shelter’s numbers of housing units in adoption and the target LOS in adoption. This will give the expected number of monthly adoptions in column C and annual adoptions in column D if one animal is housed per housing unit.

Then enter the % that juveniles make up in the adoption population in the month that you are doing the calculations for (this obviously will be a higher percentage in the spring/summer months). Also enter the number of juveniles housed per humane housing unit in adoptions (usually 2-3). This will give the expected number of monthly adoptions in column G and annual adoptions in column H based on variable number of animals housed per housing unit.

Adoption capacity reverse calculator							
Number of housing units	LOS	Number of monthly adoptions if 1 animal/unit	Number of annual adoptions if 1 animal/unit	% juvenile	Juveniles/unit	Total monthly adoptions	Total annual adoptions
20	8	75	913	50%	2	113	1369



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LOS if housing units full given monthly rate of adoptions

This calculator allows you to see how many animals to have housed in adoption and what the expected LOS will be if the housing units are kept full. Based on the information entered about fast track animals, the expected LOS for slow track animals will be calculated.

Length of stay if housing units full given monthly rate of adoptions										
Number of housing units	% juvenile	Juveniles/unit	# of cats housed	Monthly adoptions	LOS if kept full	% fast track	Fast track LOS	Fast track weighted average	Slow track %	Slow track LOS
20	50%	2	30	82	11	75%	3	2.25	25%	35

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Additional Resources

- Animal Sheltering article [What's Your Magic Number?](#)
- [Million Cat Challenge](#)
- An overview of [capacity for care](#)
- Dr. Kate Hurley's Conference Lectures from the 2014 University of Florida's Shelter Medicine Course (video recordings):
 - [Part 1](#)
 - [Part 2](#)
- Information sheet on [Facility Design, Shelter Animal Housing and Shelter Population Management](#)



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