Oregon Corrections Population Forecast

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Background

The Office of Economic Analysis (OEA) produces the semi-annual Oregon Corrections Population Forecast which provides projections of the offender populations supervised by the Oregon Department of Corrections (DOC). The forecast estimates the number of inmates in the state prison system, offenders on probation, parole, post-prison supervision, and felony offenders serving sentences of 12 or fewer months in county jails.

Executive Order 95-06 and Oregon Revised Statute 184.351 direct the Department of Administrative Services (DAS) and the Corrections Population Forecasting Advisory Committee to produce the forecast. The forecast is mandated to estimate monthly populations over a ten-year period and is published April 1st and October 1st of each year. State agencies, in particular the DOC and the Oregon Criminal Justice Commission (CJC), are mandated to use the forecast for budgeting and policy development where the offender population is concerned.

The Advisory Committee, whose members are appointed by the Governor, is comprised of individuals with knowledge of the criminal justice system. Advice from the Committee forms the basis for forecast assumptions regarding policy and practices in the criminal justice system and the impact of law and policy changes on the corrections populations. Committee members bring to the forecast process decades of diverse experience in the public safety system. They meet several times prior to each forecast release to discuss forecast-related issues such as trends in crime, potential impact of new laws, changes in public safety policy or practices, and to advise technical aspects of the forecast process.

Corrections Population Forecasting Advisory Committee

Jeffrey Howes (Chair)	Multnomah County Deputy District Attorney
Honorable Debra Vogt	Lane County Circuit Court
John Haroldson	Benton County District Attorney
Jessica Kampfe	Marion County Public Defender's Office
Michael Hsu	Parole Board
Michael Schmidt	Criminal Justice Commission
Colette Peters	Director Department of Corrections
Jeffery Wood	Director Marion County Community Corrections
vacant	Oregon Sheriffs representative

The general forecast process, the publication of the forecast (this document), and technical aspects of performing the forecast (e.g., data analysis), are managed by OEA, in partnership with the CJC, and with substantial assistance from the DOC.

For more information or questions regarding the forecast please use the following contact information:

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Forecast Assumptions

The forecast assumes that current laws and current criminal justice practices continue as they are now. It also assumes trends in criminal activity continue and demographics follow expected trends. If those or other assumptions fail, the forecast is at risk.

In the outer years of the forecast, fundamental shifts in criminal tendencies in the general population pose a risk to the forecast. For example, over the past decade overall crime rates, including serious person crimes, have declined. If that trend were to reverse itself over the coming decade, the corrections population could expand well beyond current forecast.

Criminal justice system practices have a significant effect on the flow of individuals through the court system and into the prisons. Emphasis on specific criminal activity and plea practices, for example, can change based on law enforcement policy and prosecutorial discretion. The amount of discretion in the corrections system, in particular with respect to prosecution of crimes and punishments sought, introduces a considerable degree of uncertainty to the forecast. Even if there was never a change in criminal activity or laws in Oregon, the prison population could vary considerably based on administrative procedures, policies, and individual discretion exercised in law enforcement, prosecution, plea bargaining, and sentencing by judges.

Forecast Methodology

Inmate Population

The inmate forecast uses a model that simulates inmates entering prison, their length of stay in prison, and final release. The primary driver of the forecast in the short term is the release rate of the existing prison population. In the long term, new intakes drive population trends. The rate of intakes and releases results in turnover of about half the inmate population every 18 months.

The long-term prison population depends primarily on the forecast of future intakes (number and lengths of stay). In contrast to releases, future prison intakes cannot be mechanically determined based on any current information. Intakes are forecasted based on historical trends and anticipated population growth in Oregon. The trend integrates demographics, crime rates, criminal justice practices, and other factors which influence intakes and sentence lengths. The forecast assumes future intake trends will be similar to what has been observed in the recent past. The release profile for future intakes is a function of recent patterns as well.

As a technical note, modeling the prison population relies on both the number of intakes each month and how long each inmate will stay. The forecast handles the number of expected releases by simulating the full distribution of lengths of stay. The forecast tracks the number of intakes broken down by lengths of stay in one-month increments up to 10 years. The total time in months created by adding up all the individual lengths of stay for intakes is termed 'intake volume', and is measured in bed-months. For example, if intakes occurred at a fixed level of 10,000 bed-months per month for many years, the prison population size will eventually equal 10,000 beds. That would represent a long-run steady-state population level where intakes exactly equal releases every month.

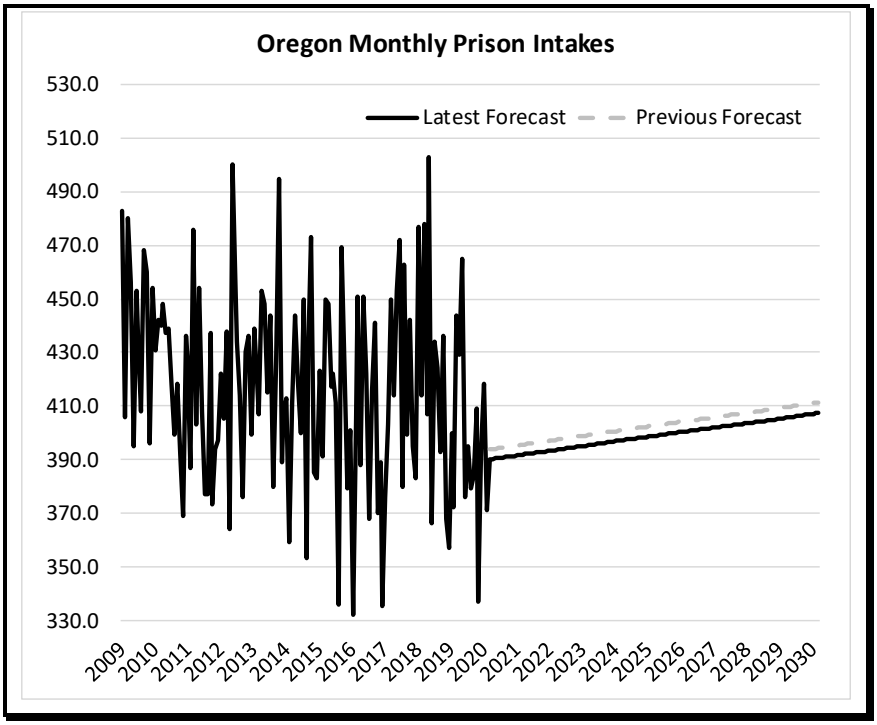
Prison intakes are the major determinant of the long-term prison population size, so it is valuable to have factors which are predictive of future intakes. The size of Oregon’s population, as well as its age and gender mix, are primary determinants of future intakes. Changes in criminal sentencing laws are another major factor. When sentencing laws change, the full effect on prison populations can take years to be fully realized, but an attempt is made to estimate and incorporate the complete policy impact in the forecast as soon as the law is passed.

Various other factors have been suggested and checked for possible value in predicting future prison intakes. These include trends related to crime, the economy, student assessments, and court filings. Generally speaking, aside from population cohort sizes, there are no obvious causal (or predictive) relationships to prison trends which the forecast can rely on. Therefore, the forecast for future intakes is solely based on intake trends from the recent past with adjustments for law changes and population growth.

The final forecast is the sum of individual forecasts that explicitly break it down into smaller pieces to improve transparency and to better illuminate the potential impact of future policy reforms. Detailed forecasts are generated by gender and by crime type. This has broken the forecast down into smaller pieces which are more manageable for analysts and allow forecasters to highlight more detailed crime trends.

The forecast is seasonally adjusted[1]. It is known that the prison population oscillates in a seasonal pattern. Depending on the day of the week or month, prison populations can change by almost 100 prisoners. An algorithm has been created that simulates these variations and implements them into the current forecast. Incorporating seasonal trends explains most of the recent variability in the short-term forecast, and makes the near-term forecast considerably more accurate.

Intake Trends

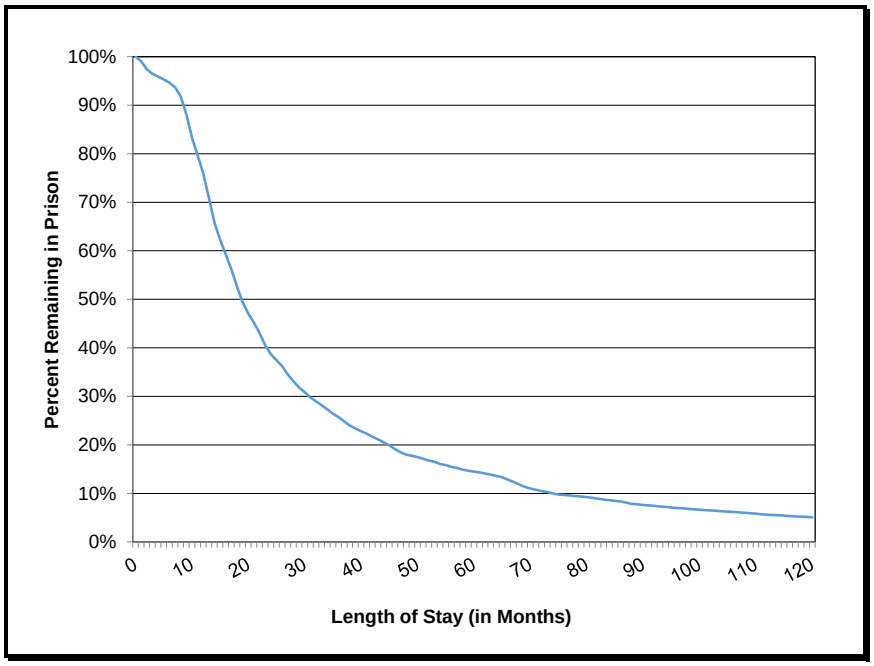


The graph to the right presents intakes to prison for all offenders. The first thing to note is that the monthly variance in intakes is quite large. This introduces significant month-to-month volatility into the prison population. Intakes began to increase with the resumption of Measure 57 in January 2012. This was followed by a level shift down with the implementation of HB 3194 and then another shift down following the effective date of HB 3078. The latest forecast is slightly lower than the previous, due to ongoing declines that are most likely the result of Criminal Justice Reinvestment programs. The growth exhibited by the intake forecast is driven by predicted growth in the 18-39 ("at-risk") population. This assumption implies that crime rates will remain flat throughout the forecast horizon.

[1] Standard economics' "seasonal adjustment" evens out seasonal oscillation and derives underlying trends. The DOC seasonal adjustment does the opposite, it implements seasonal oscillation into underlying trends to better forecast a precise month.

Release Profile of Incoming Inmates

The graph to the right presents the release profile of recent intakes, which is a critical component in forecasting the length-of-stay characteristics of future intakes. Note that for each given intake class, roughly half will be released within 18 months. The committee discussed the significant drop in the profile for Male and Female Person Crime cohorts. This change ultimately boiled down to a shift towards lower length-of-stay offenses, as well as a decline in average sentence lengths for many person crimes.



Modeling the Inmate Population

Conceptually, the forecast model operates as a sequence of discrete months, feeding forward from one month to the next. Each month starts with the base population for the month; i.e., a distribution of expected length of stay for inmates who are in the prison population on the first day of the month. Lengths of stay less than one month represent inmates who will be released prior to the next month and are removed from the model. The number of intakes and distribution of their lengths of stay is projected for each month and flows into the base population for the next month. The equation below represents the elements:

Population Base (Month 2) = Population Base (Month 1) + Intakes – Releases

Starting with the October 2016 forecast, the prison population has been disaggregated into six distinct subpopulations: (1) Female – Person Crimes; (2) Female – Property Crimes; (3) Female – Statutory Crimes; (4) Male – Person Crimes; (5) Male – Property Crimes; (6) Male – Statutory Crimes. Each population is modeled separately with its own release rate, profile and intake forecast.

Forecast Risks

Dynamic Environment

Fundamental changes in the corrections system, or its inputs, degrade the value of historical trends in forecasting and present a considerable risk to forecast accuracy. System changes establish new relationships between criminal activity and the prison population, and those relationships cannot be known until after stability in the system is reestablished. For example, Measure 11 had considerable indirect impact on the prison population via changed plea practices. It took several years following the implementation of Measure 11 for that effect to be known.

Starting in January 2009, there have been several significant changes in the corrections system from Ballot Measure 57 (2008), House Bill 3508 (2009), Senate Bill 1007 (2010), Ballot Measure 73 (2010),

Senate Bill 395 (2011), House Bill 3194 (2013), HB 3078 (2017)[2], and to a much smaller degree SB 1562 (2018). In this forecast, adjustments are made for the 90-day-transition leave component of House Bill 3194, House Bill 3078 (see page 10 for details on this law change), and SB 1562. Prospective impact estimates are forecasts in and of themselves. As much as the baseline forecast can exhibit error, so too can impact estimates. This introduces additional risk to the forecast.

The most significant immediate risk is the level of funding approved in the 2019-21 Department of Corrections (DOC) budget for community corrections programs administered at the county level. The DOC completed the every-six-year rate study regarding the cost of community corrections supervision, including local control (jail beds), probation and parole/post-prison supervision. The study found that in order to fully cover the cost of supervision, rates would need to rise substantially. However, the prescribed rates were not adopted in the 2019-21 Legislatively Approved Budget. This could potentially lead to counties sending more offenders to prison. In addition, to the extent that base community corrections and criminal justice reinvestment grants are fungible, the programs funded by the latter grants could be at risk. In particular, these supplemental programs have enabled significant use of the 120-day short-term transition leave afforded by House Bill 3078 (2017). All in all, the committee expressed concern that there is great risk of higher prison bed usage than predicted in this forecast.

In addition, House Bill 2328 (2019) changed the mental state required for the finding that a defendant committed the crime of unlawful use of a vehicle. The defendant, as well as any passenger, must only know that the risk exists that the owner did not consent to the use of the vehicle. The impact is minimal at first and rises to an increase of 92 beds at full impact. However, there is a risk that the law change could result in more intakes to prison that currently estimated.

Finally, Senate Bill 1002 (2019) eliminated a prosecutor's ability to waive eligibility for certain sentence reduction programs, including the Alternative Incarceration Program, in a plea deal. While no impact was included in the forecast, there is the potential on either side for a modest impact. In particular, prosecutors could increase the sentence length of the plea offer to compensate for not being able to waive potential sentence reductions where such a stipulation would have otherwise been made. However, if the result is that more offenders become eligible for sentence reduction, the impact could be fewer beds.

Future Policy Changes

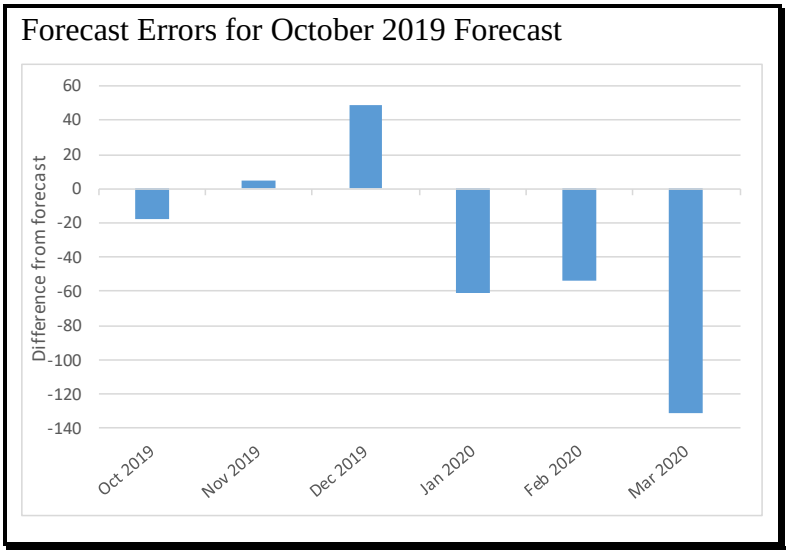
In recent years, the majority of forecast error can be traced to changes in public policy rather than demographic or behavioral changes among potential offenders. Given the dynamic policy environment, policy changes represent the largest risk to the forecast. As has been proven in recent years, voter initiatives have the potential to drastically change the public safety system. The fiscal condition of state and local governments also represents a risk to the forecast. In particular, counties which have historically received federal timber payments face significant budget risks which could impact the public safety system, and potentially change the quantity and character of felony sentences. Fewer fiscal resources dedicated to public safety would be expected to reduce the prison population in the near term, but that effect could later reverse if underlying crime rates increased.

[2] https://olis.leg.state.or.us/liz/2017R1/Downloads/MeasureDocument/HB3078/Enrolled

Forecast

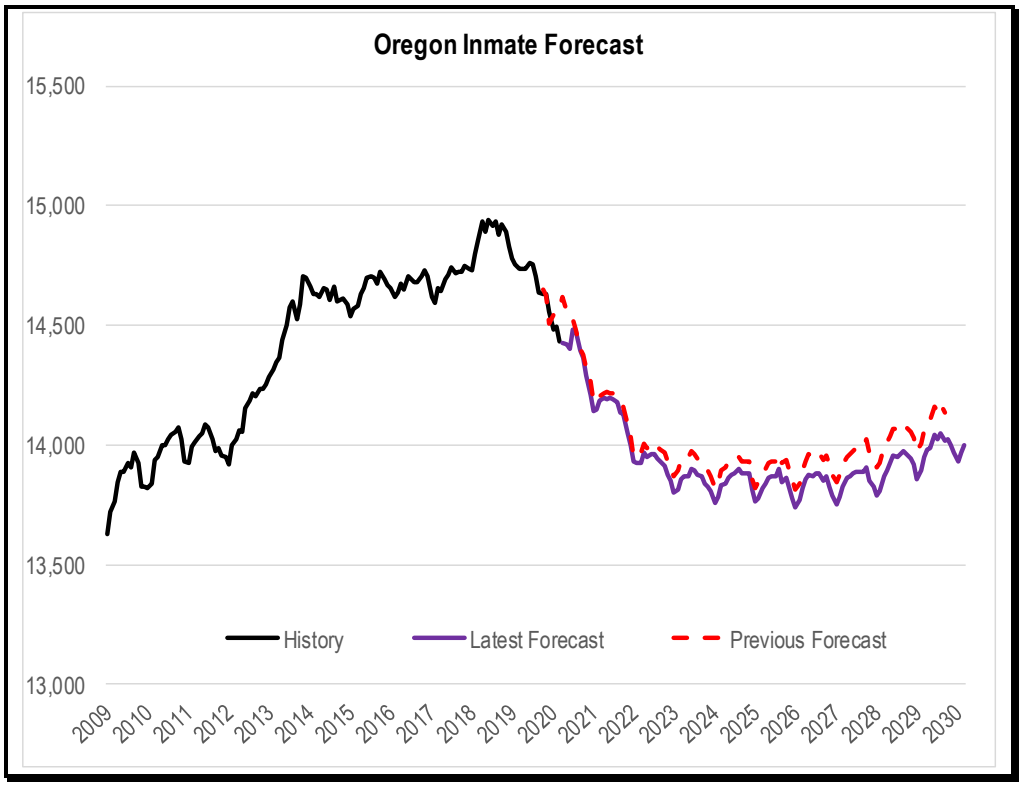
Prison Inmate Prior Forecast Tracking

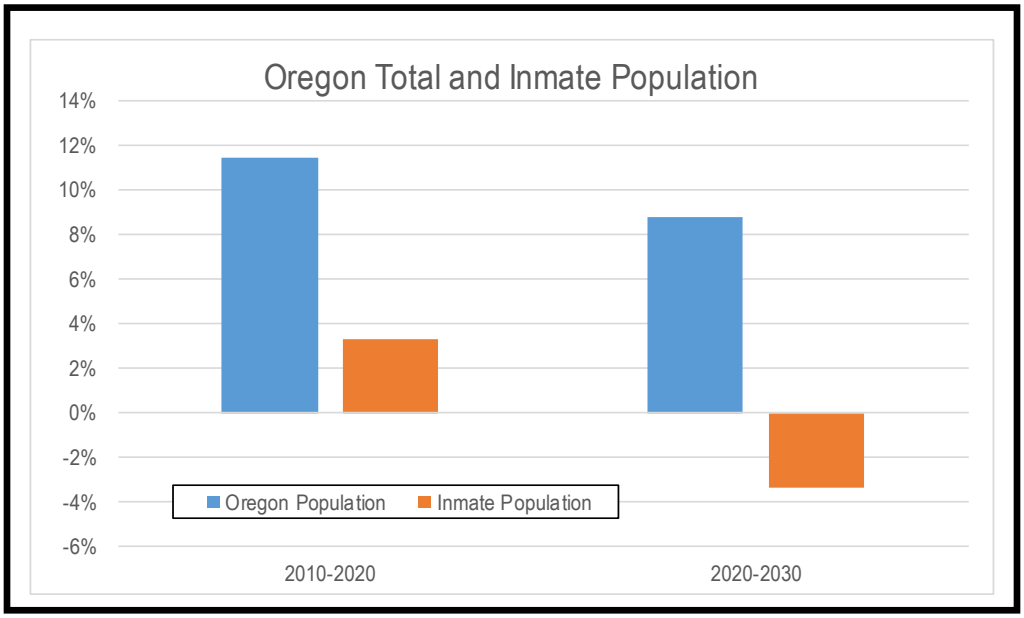
Forecast errors for the last forecast, averaging 35 beds below the forecast, occurred across all male offender populations, as well as in the female property offender cohort. It should be noted, however, that the average was pulled down significantly by the negative 131-bed error on March 1. The impact of House Bill 3078 and the Criminal Justice Reinvestment program are becoming apparent in the data for both intakes and sentence lengths in the property and statutory offender populations.



Prison Inmate Forecast

As indicated in the chart below, the prison bed forecast exhibits a significant decline over the next four years due to the continuing effects of House Bill 3078, followed by modest growth owing to growth in the at-risk populations. The number of inmates housed in Oregon's prisons, currently 14,435, is expected to equal 13,997 in ten years. The 10-year change in inmates is negative 3.0 percent. To put that in context, Oregon's population is expected to grow 8.8 percent over the same timeframe. As a result, the incarceration rate (prison beds per 1,000 population) is expected to fall 11.2 percent over the next ten years. Note that the inmate population has grown at about one quarter of the rate of the overall population over the last ten years now that recent criminal justice reforms are taking effect.





Male

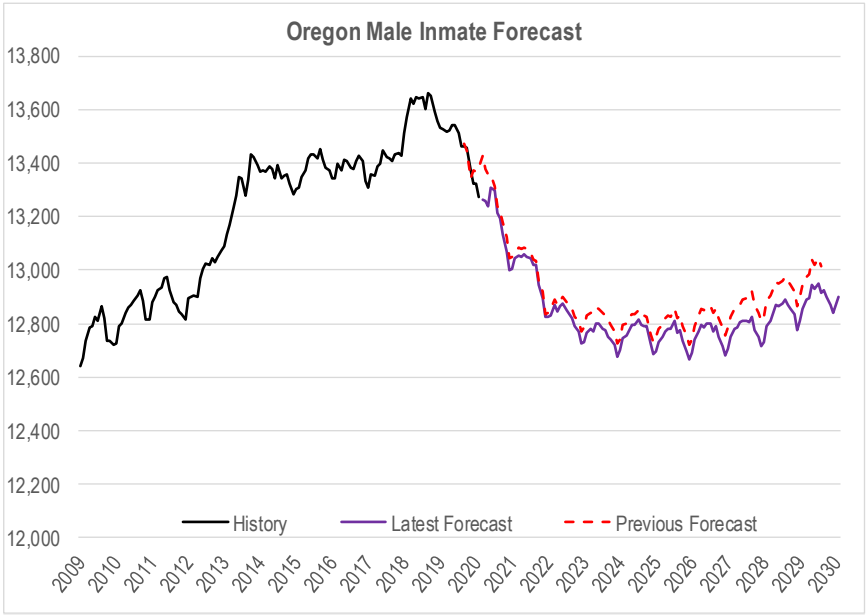
The accompanying graph illustrates the total male inmate population forecast.

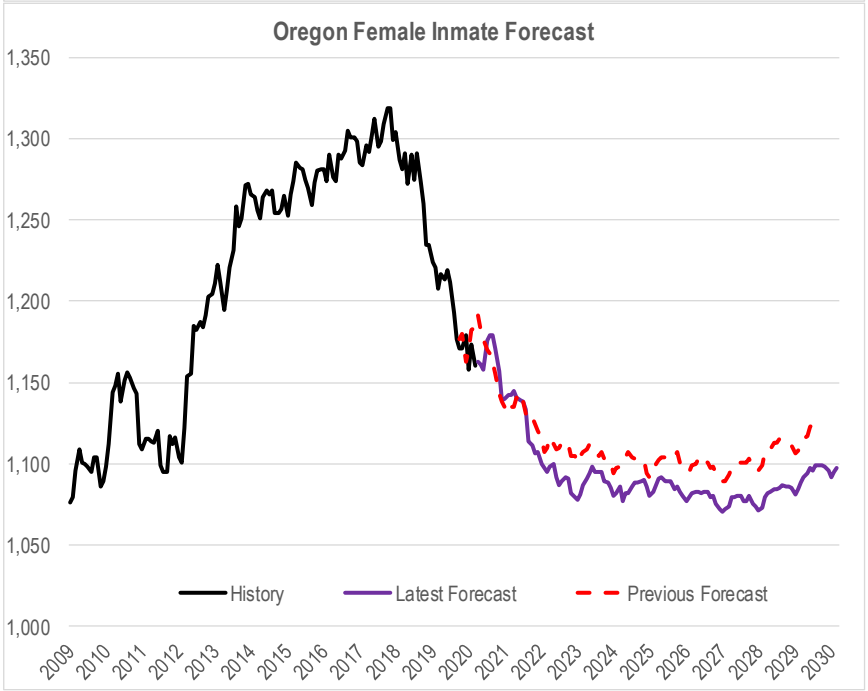
The current male forecast estimates that on April 1, 2030 there will be 12,899 male inmates—a 2.8 percent drop due to the anticipated impact of House Bill 3078, including a significant increase in expected use of 120-day transition leave.

Female

The graph to the right illustrates the total female population forecast.

The female population is expected to drop 5.4 percent between April 1, 2020 and April 1, 2030, culminating in 1,097 beds. This is due to the prospective impact of House Bill 3078, including a substantial increase in expected use of 120-day transition leave. Most of the drop is realized in the property crime population as this is where components of the bill were focused.

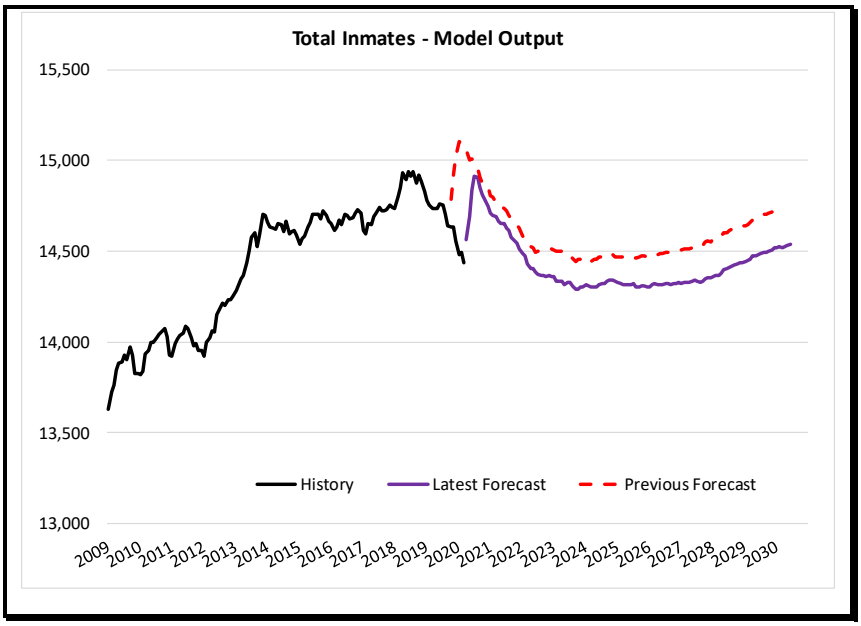




Components of Change

There are two components of change in each prison forecast: updates to the model due to new empirical data and new law changes.

Model Updates



When new DOC data are input into the forecast model, changes in intakes, sentence lengths, releases, etc. are integrated and create a "new normal" within the model. The graph to the right exhibits the change to the model output prior to any add factors for the prospective impact of recent law changes. The model output appears to project a near-term spike in the prison population. This is a product of how transition leave is handled in the model as a structural add-factor. Once transition leave is factored into the forecast, the near-term jump disappears (see final forecast).

New Law Impacts

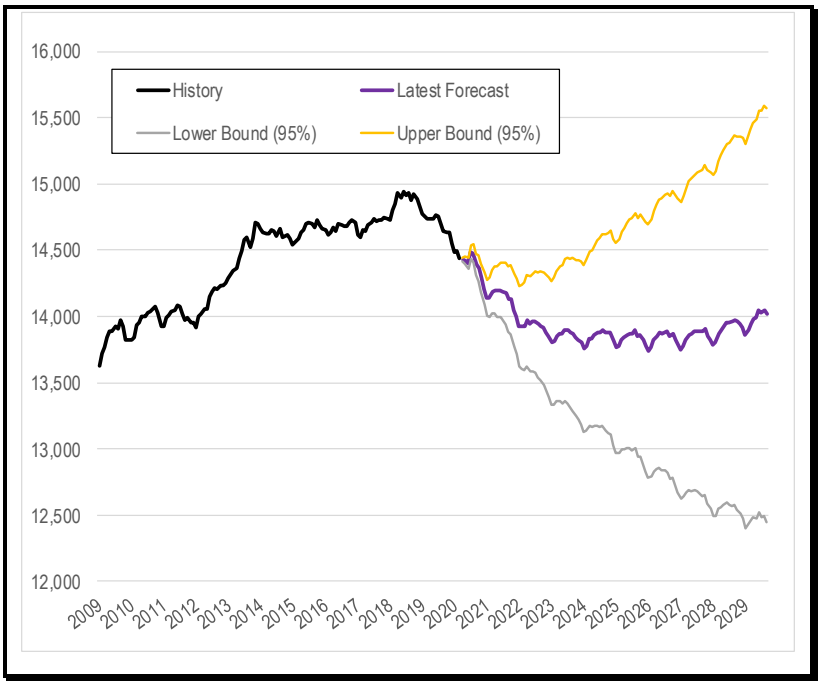
HB 3194 passed in the 2013 regular legislative session and the effects of its sentencing components have been fully realized in the data. As discussed above, transition leave is maintained as a permanent add-factor due to the way the program effects the data. For 2017, the Legislature passed House Bill 3078. This is a comprehensive measure aimed at eliminating the need to open new prison beds in the near term. The bill includes extending transition leave to 120 days. It also moves theft and identity theft outside of Measure 57 sentencing. It is estimated that approximately 85 percent of the expected impact of this bill have been realized in the data. In the 2018 Legislative Session, Senate Bill 1562 was passed to augment the definition of strangulation, a person-crime offense. The impacts are minimal. For the 2019 Regular Session, the only explicit adjustment was to incorporate the moderate impacts of House Bill 2328 affecting incarceration rates associated with the unlawful use of a vehicle as described in the risks section.

Margin of Error

Oregon HB 3194 directs that the Department of Administrative Services "identify the forecast's margin of error" (Section 46-3(a)). The margin of error depends on the timeframe being examined. Historical error rates serve as a guide for assessing the potential for actual prison population counts to differ from the forecast in the near term.

The historical deviation for the October of odd year forecasts, when gauged at the end of the same biennium, is 4.3 percent. As such, there is a 95 percent probability that the actual prison population will fall in the 13,821 to 14,559 range. The primary driver for potential upward error in the near term is error in the forecast for releases and intakes in the coming months.

In addition to the forecast's role in near- to medium-term budgeting, the forecast is also used to guide long-term planning for prison capacity. Coming up with a predicted margin of error for the 10-year forecast is complicated by the fact that major law changes (Measure 11, Measure 57, HB 3508, House Bill 3194, and now House Bill 3078) produce large errors in the forecasts that preceded their passage. The prison forecast presented here does not anticipate potential law changes. The 10-year margin of error for this forecast should coincide with potential model error, thus making historical error rates inappropriate. A better gauge is derived from analyzing growth rates for time frames more or less absent of law changes to assess the potential for the projected baseline growth of negative 3.5 percent to be off. Computed in this way, there is a 95 percent probability for the actual inmate count to differ from this forecast by up to 11.7 percent in either direction.



Community Corrections

The community corrections population involves felony offenders who are not in prison. It also includes certain offenders convicted of misdemeanor possession of a controlled substance under House Bill 2355. The Department of Corrections receives General Fund that it passes to 34 of the 36 counties to provide direct oversight. In Linn and Douglas counties, the Department staffs the community corrections department directly.

The forecast projects the felony probation caseload, local control population (incarceration in jail), and post-prison supervision and parole (Parole/PPS). Each group is forecasted separately for budgeting purposes. The community corrections forecasts rely primarily on the relatively stable historical trends in the respective populations.

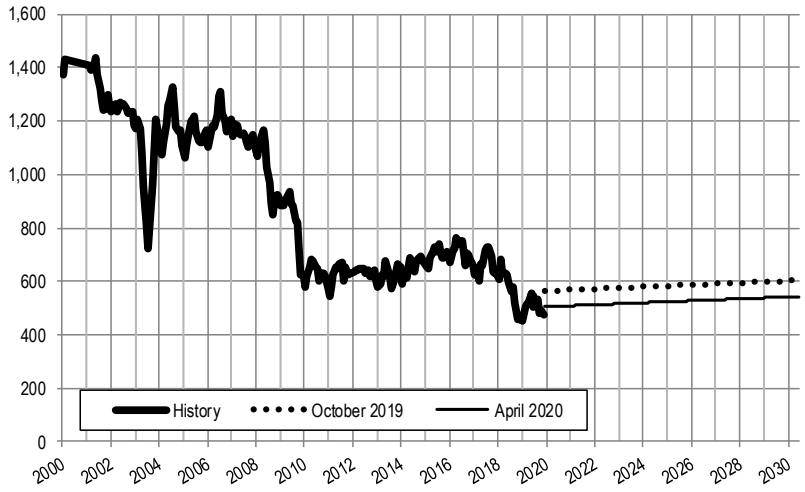
The forecasts for Local Control, for Parole/Post-Prison Supervision, and for Probation populations reflect change to match the most recent data on actual population sizes. The Local Control and Parole/Post-Prison Supervision cohorts have exhibited modest declines since the last forecast, while the Probation population is somewhat higher.

All three populations now include impact estimates for Senate Bill 1562 passed during the 2018 Session. Both the probation and post-prison supervision populations now include lifetime supervisees back a decent length of time and can be considered evident in the historical data. Finally, the funded community corrections population includes both felony and designated drug related misdemeanors because of HB 2355 (2017).

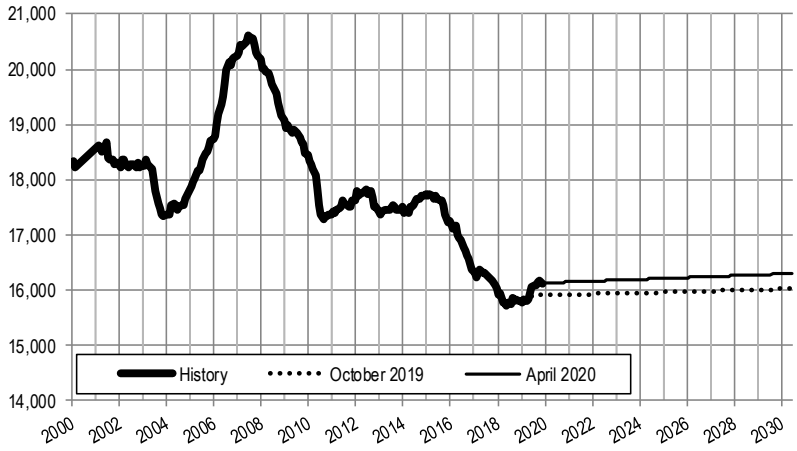
The Local Control forecast numbers do not include jail beds occupied by repeat DUI offenders which are reimbursable under Measure 73 (2010). The reimbursement provisions of Measure 73 require separate budgeting for those beds, and, while the majority of the jail usage falls under the umbrella of Local Control, pre-trial jail time does not.

The three graphs below (next page) show the population history (heavy line), the current forecast (light line), and the previous forecast (dotted line) for the local control, the probation, and the parole/PPS population groups.

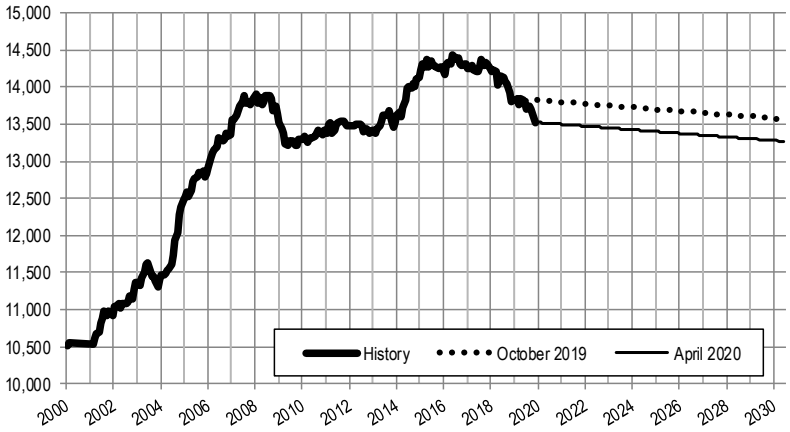
Local Control Forecast



Probation Forecast



Parole / Post-Prison Supervision Forecast



Law Change Impacts

This forecast is based on current laws and practices, meaning that projections assume crime and sentencing laws and practices will not change over the 10 year forecast horizon. Laws currently in effect, including recently enacted changes, are incorporated in the forecast. For recent law changes, the forecast applies specific adjustments; for older law changes, the effects are part of the baseline data and are determined within the model. The forecast adjustments for recent law changes generally derive from the financial/fiscal impact statements for the associated bill or ballot measure until new data become available.

Sources of Forecast Error

Forecast error is the difference between what was forecasted at a specific point in the future and what is actually observed when that time comes. Understanding the sources of forecast error is helpful in interpreting forecast risks.

The largest source of forecast error is associated with law changes which become effective after the forecast is released. There have been a number of laws over the past 20 years which caused, or were expected to cause, prison population changes of a magnitude significant to the forecast. The forecast does not project law changes or practical application of current law, but rather assumes the current legal environment persists unchanged across the 10-year forecast projection period.

Forecasts released following major law changes can suffer from incorrect estimates of the impact of the law change on the prison population. This is because law changes often have a significant indirect impact that is not known until it is evidenced by data, sometimes months or years later.

Regardless of law changes, there are additional sources of error with baseline forecast projections. The forecast relies on modeling the release of current prisoners and projecting the intake of future prisoners. Although the sentences pronounced in court judgments are known, the actual length of stay of an inmate in prison can vary considerably from what is expected based on the judgment. This introduces error into the model. Situations which make the length of stay indeterminate include: resentencing to a longer or shorter sentence; indeterminate parole board sentences (before the guidelines); participation and success in Alternative Incarceration Programs; Transition Leave; time served after failure on probation or parole; death of the inmate; transfer in/out of state; amount of earned time earned; absconding or return from absconding; temporarily out for medical reasons or court appearance.

Further out in the forecast horizon, error in projecting future prison entrants can be significant. The forecast accuracy depends on the accurate projection of the number of future prison intakes and their lengths of stay. Differences of as little as one percent in projected intake rates could add to an overall error of 1,000 beds over the forecast horizon. As such, the outer years of the forecast are very sensitive to the accuracy of assumptions regarding new intakes.

Finally, daily variation in the prison population due to intake and release activity is considerable. The population on a given day regularly deviates from the monthly average population by more than 100 beds. Therefore, the actual population on the first day of a given month can be expected to differ from the forecast value by 100 beds without concern. This also means that forecast values should be interpreted as the mid-point of a range (+/- 100) within which the actual population will fluctuate.

Appendix: Prison Population Forecast Values

All forecast values are published in spreadsheet format and can be viewed and downloaded from the link below. The spreadsheet includes forecast data tables for the prison and community corrections forecasts and some additional forecast-related data such as: male and female forecasts; Male-person, -property

and -statutory forecasts; seasonally and non-seasonally adjusted forecasts; and new law impact estimates.

http://oregon.gov/DAS/OEA/corrections.shtml.